V. 7 - No. 40

THE FOUNDRY

1895

THE FOUNDRY PUB. CO.
DETROIT

Christmas Number

A FACING and Blacking to be satisfactory for all kinds and weights of castings, that can be shaken on the mold and be slicked nicely, or when mixed with water will make a good core wash, that can be used for dry sand or loam work, stand the heat and weight of molten metal whether poured hot, slow or fast, and not burn off, wash or run and will peel clean from the casting, is a Facing and Blacking that we think should interest every foundryman and molder living.

Just such a Facing and Blacking is RADIANT, and furthermore, we guarantee it to be so and will take it back and refund the price if it is not. WHAT MORE CAN WE OFFER? Radiant Facings is sold entirely on its merits and nothing else whatever has had anything to do with the extraordinary success of this Facing and Blacking. We have had some foundrymen tell us that it is undoubtedly the best general Facing and Blacking they ever used, but that they thought the price was too high. Is 2¼ cents per pound too high for the best Facing and Blacking on earth? We have noticed that these same people will buy Plumbago or Silver Lead at twice and more the price and never complain. Plumbago or Silver Lead are all right. We sell them, and would like to sell a good deal more of them; but there are objections to their use in the foundry doing general work that are overcome by the use of Radiant Facing and Blacking. How many complaints we hear about the hardening of

the surface of castings? There is nothing that will harden the surface of the casting sooner or or more effectually than Plumbago or Silver Lead. We grant that Plumbago or Silver Lead makes a beautiful mold and a pretty (?) bright looking casting; but the question is whether this color or a casting is more satisfactory than a dark blue steel color such as the Radiant Facing and Blacking gives it? Radiant Facing and Blacking will not harden the surface of the casting. It can be shaken on the mold, through a bag, on parts that cannot be reached with a tool to slick it, and the facing will stick and peel clean.

The whole matter is that Radiant Facing and Blacking is the very best, most economical and satisfactory Facing and Blacking for the general jobbing foundry. There is no question about this and if you have any doubts about it, send for a barrel subject to approval. Our guarantee is that it will do everything we have stated above, otherwise you need not keep it and we will pay the freight.

The J. D. Smith Foundry Supply Co.

Manufacturers of Foundry Facings, Blackings.
Foundry Supplies, and Refiners of Plumbago.

Cincinnati, Ohio, U. S. A.

THE S. OBERMAYER COMPANY

WISH YOU A

MERRY CHRISTMAS

AND A

HAPPY AND PROSPEROUS

1896

OUR NEW CATALOGUE WILL SOON BE READY FOR DISTRIBUTION

1896

Gives promise of a revival of business to the 1892 basis. With improved machinery and an increased output we are prepared for it, so when making inquiries or placing your orders for . .

Foundry Facings, Foundry Blackings,
Foundry Supplies, Pure India Silver Lead,
Pure East India Plumbago,

Or in fact anything required in your foundry excepting Fuel or Iron. Kindly bear us in mind. . . .

ALL GOODS GUARANTEED. TRIAL SAMPLES FREE.

The S. Obermayer Co.,

CINCINNATI, O., (Main Office.)

CHICAGO, ILLS. LARIMER, PA.

ESTABLISHED
1856

J. W. Paxson & Co.

J. W. Paxson
J. K. Bougher
A. B. Paxson
Howard Evans
H. M. Bougher

DEALERS IN ALL KINDS OF

MOLDING SAND

MANUFACTURERS OF
Foundry Facings and
Foundry Equipments.

OFFICE AND FACTORIES
Pier 45 or 1021 N. Delaware Ave.,

Philadelphia, DECEMBER 17, *189* 5

John A. Penton, Editor The Foundry,
Detroit, Mich.

DEAR SIR:—

We want to make the announcement through THE FOUNDRY that we are about finishing up the FORTY-FIRST year of our business career and to extend thanks to our many customers over this broad land for their liberal assistance and encouragement.

Our facilities have been improved to keep pace with the times, until now we actually make nearly all the Foundry Supplies we advertise and can furnish everything wanted in a Foundry from a Cupola down to a Molder's Tool, as well as :

MOLDING MACHINES,
BLOWERS,
LADLES,
FOUNDRY FACINGS,
RUMBLERS,
CORE OVENS,
CUPOLA LININGS,
PLUMBAGOES,
MOLDING and CORE SAND for Iron, Steel and Brass Foundries.

We are at present running :

Four FOUNDRY FACING Mills.
One FOUNDRY SUPPEY Factory.
One Quarry and Mills for grinding SILICA ROCK, GANISTER and MOLD WASH for Steel Foundries, Furnace Bottoms, etc.
One Quarry for taking out MICA SCHIST or FIRE STONE for lining Bessemer Converters, Cupolas and Lime Kilns, to take the place of Fire Brick.
One Quarry for taking out MICA SAND for making Fire Brick and Stove Linings, also for Patching up burned out portions of the Cupola.
Twenty-seven MOLDING SAND Farms or Pits from which we take out the different grades of fine and coarse MOLDING SAND, CORE SAND, FIRE CLAY, FIRE SAND, SILICA STEEL SAND, etc.
Five STEAM BARGES.
Twelve FLOATS and Three TUG BOATS that are used in making deliveries of Sand, etc., by water.

In addition to the above, we employ TWO HUNDRED MEN and EIGHTY TEAMS for taking out and delivering material to the Foundries, Railroads, Steamships, etc.

All orders and correspondence will be appreciated.

We remain, your obedient servants,

Dictated Evans.

J. W. Paxson & Co.

WHITEHEAD BROTHERS COMPANY,

—DEALERS IN—

Mouding Sand, Fire Sand,
Phiadelphia Sand, French Sand,
Fire Clay, Kaolin, and Foundry
Facings and Supplies of all Kinds,
Lead Facings a Specialty.

515-17 West 15th Street, NEW YORK.

PROVIDENCE OFFICE:
42 S. Water St.

BUFFALO OFFICE:
70 and 72 Columbia St.

WORKS AT

Cheesequake Creek, N. J.
South River, N. J.
Raritan River, N. J.
South Amboy, N. J.
Wareham, Mass
Centre Island, L. I.
Waterford, N. Y.
Albany, N. Y.
Cedar Hill, N. Y.
Coxsackie, N. Y.
Clinton Point, N. Y.
Athens, N. Y.
Coeymans, N. Y.
Willow Springs, N. Y.
Poughkeepsie, N. Y.
Crescent, N. Y.

THAT in spite of the number of imitations placed upon the market (all claiming to be "Just as Good") that our sales of

C. F. M. Perfect Wash

during 1895 were double those of 1894.

Of course, some of our customers were busier and needed more (they would not use anything else after once trying it) but we have secured a number of new ones and they keep right on ordering "another barrel, same as last."

In some cases, we know certain concerns buy the bulk of their foundry supplies from other houses (near at hand, perhaps; those things cannot always be helped) but it is funny how they do insist upon having that Wash for their best work. "Allee Samee" whether the work is . . .

DRY SAND OR LOAM,
GREEN SAND OR SKIN DRIED

it works just the same **wet** or **dry**. Can't help it. Made of the right materials, thoroughly ground and mixed. We sell it very cheap, too. The day of fancy prices has gone by.

All Our Foundry Supplies are like our Wash—THE BEST.

Cleveland Facing Mill Co.

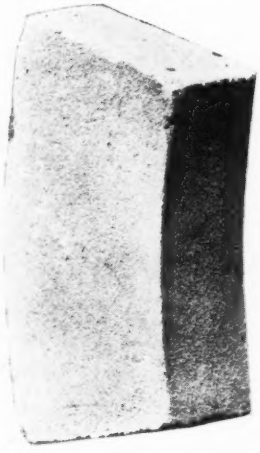
TRIAL SAMPLE FREE. **CLEVELAND, O.**

Ohio's Choicest Molding Sands

FOR BRASS CASTINGS

Red Hill Brass Sand, Crushed Rock Core Sand Nos. 2 and 4, are used all over the United States.

FOR IRON CASTINGS



Glenford, Sandusky and Zanesville Molding Sand.

SEND FOR SAMPLES AND CATALOGUE.

The Acme Cupola Block

Not any higher in price than other high grade Fire Brick, but much better for Cupola Lining, because they are made to

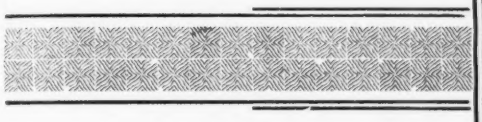
STAND THE WEAR AND TEAR, AS WELL AS THE HIGHEST HEATS.

The Ohio Sand and Clay Co.

COLUMBUS, O.

T. P. KELLY & CO.,

MANUFACTURERS OF



Plumbago, Foundry Facings and Blackings

DEALERS IN

FOUNDRY SUPPLIES

We are the largest grinders of PLUMBAGO for FOUNDRY purposes in the United States. Our "B. M." brand of PLUMBAGO will assimilate with any SAND.

It is thoroughly purified being chemically free of

ALUMINA, SILICA, MICA

AND OTHER IMPURITIES.

We GUARANTEE SMOOTH CASTINGS and satifactory results wherever it is used.

MILLS AT
BLOOMSBURY, N. J.
AND
REISSING, PENN.

CHICAGO OFFICE:
121-127 NORTH ADA ST.
NEW YORK OFFICE:
284 PEARL ST.

MEXICAN GRAPHITE FOUNDERS' WASH

THE guaranteed equal of any Silver Lead Facing. Applied with hand, shake-bag, or brush.

Mixed in water, it makes **A Perfect Wash** for cores and dry sand work.

Made from the pure product of our Graphite mine in Mexico, owned and operated by ourselves.

This facing is our specialty and is in use in over 900 foundries in the U. S. and Canada.

It will save you over $5.00 per barrel in first cost alone, and is submitted subject to your entire approval.

THE UNITED STATES GRAPHITE CO.

Office and Factory—

SAGINAW, MICH., U. S. A.

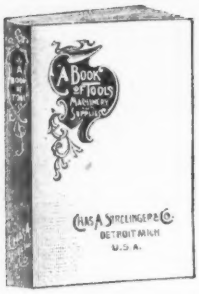
Graphite Mines—
TORRES, SONORA, MEXICO.

NOTE—Don't fail to ask us for some of our pencils. They are the finest in the world, and we keep them for gratuitious distribution. and esteem it a pleasure to supply them on request.

At a low estimate the world's production is 700,000,000 pencils annually. Nearly every high grade pencil, and over half of all the pencils made (over 350,000,000 per year) are made from our Mexican Graphite.

McCULLOUGH DALZELL COMPANY
MANUFACTURERS OF
CRUCIBLES · STOPPERS
AND ALL ARTICLES CONTAINING PLUMBAGO
PITTSBURG, PA. U.S.A.

A Book of Tools



WHAT IS IT?

It is a catalogue, but is quite unlike any catalogue ever before issued, it does'nt leave much for the tool user to "guess" at. The ordinary trade catalogue—with its high list prices, and long string discounts and inflated claims for everything—is misleading, and instead of being a help is oftentimes a hindrance. Our **Book of Tools** contains 540 pages and over 2000 illustrations of tools and machinery and is especially complete in foundry supplies.

Wm. Ulrich, Mattewan, W. Va., says: "I would not be without it for five dollars. To any one who cares for tools and machinery it is a great satisfaction to have such a book of reference. One thing is of especial value, that is the perfection of the illustrations and descriptions; they are so perfect that any one can get an idea of what the goods look like."

THE WHELDEN EMERY OIL STONE

A COMBINATION OF TWO GRADES BEST TURKISH EMERY.

Around a foundry we know of nothing more important than a good and reliable grinder fitted with emery wheels made exactly for the use to which they are to be put. We are headquarters on Emery Wheels, Grinders and Supplies, and if you want some for any purpose, we can furnish them in a very short time after receiving your specifications. In ordering state what you expect to use the wheel for, diameter, thickness, size of shaft, and whether you want it to run wet or dry, and we'll bet you a whole "pig of platinum" that we'll please you. We show only a few cuts, but can furnish Grinders and Wheels to do any sort of work.

The **Book of Tools** mentioned above, contains all information about Grinders and Emery Wheels, and will be sent free to any address upon receipt of 25 cents to cover mailing expenses.

Chas. A. Strelinger & Co.,

24, 26, 28 AND 30
EAST CONGRESS STREET,

DETROIT, MICH.

Crucible.

ROBT. J. TAYLOR & SON

COR. 19th & CALLOWHILL ST. TRADE MARK. PHILA.

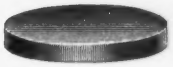
Crucible

Dipper.

Jewelers'.

Stirrers.

Cover.



Cover.

Stopper.

Crucibles

For melting STEEL, BRASS, COPPER, GOLD AND ALL OTHER METALS. We are the only PRACTICAL MEN in our business and we work strictly by CHEMICAL ANALYSIS; our CRUCIBLES will be found UNIFORM and RELIABLE at all times; they are well known all over this country and also Europe; send us a trial order and we will secure you as a customer. Also FINE GRAPHITE for LUBRICATING PURPOSES, for the devolopement of High Speed and Great Power. Our GRAPHITE is the purest in the market as Analysis will prove.

ROBT. J. TAYLOR & SON,

1900 to 1916
CALLOW HILL STREET, PHILADELPHIA, PA.

FULL SIZE ILLUSTRATIONS

——WHITE METAL——

PATTERN LETTERS AND FIGURES

For Foundrymen, Machinists and Pattern Makers, to Put Inscriptions of Names, Dates of Patent, Etc., on Patterns of Castings.

ROMAN STYLE.

⅛ 2c 3-16 2c ¼ 2c 5-16 2c ⅜ 2½c ½ 2½c ⅝ 3c ¾ 3½c

1 in. 4½c 1¼ in. 6c 1½ in. 7½c 1¾ in. 9c 2 in. 9c 2½ in. 14c 2⅝ in. (Condensed) 14c 3 in. 16c 4 in. 30c 6 in. 40c.

NOTE.—The Roman Series is a universal favorite with Pattern Makers. Extra Thin Roman 5-16, ⅜, ½, ⅝, ¾ inch made to order, of about ½ Standard Thickness.

SHARP FACE GOTHIC.

⅛ 2c

¼ 2. 5-16 2c. ⅜ in. 2½c. ½ in. 2½c. ⅝ in. 3c.

NOTE.—The Sharp or Round Gothics are all draft, beveling from the outside to the centres, A Flattened Faced Gothic is made from this series by grinding off the top of the letter about one third down.

⅛ 3-16 ¾ 1 1¼ 1½ 2 3 in.
2c, 2c. 3½. 5c. 7c. 7½. 10. 15c.

FLAT FACE GOTHIC.

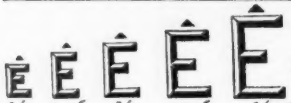
½ 2c. ⅜ 2½c. ½ iu. 2½. ⅝ in. 3. ¾ in No. 3, 3½.

NOTE.—Flat Face Gothic of Treble Thickness furnisned to order. A Block Letter.

Sharp or Flat Gothics REVERSED of several sizes for Artificial Stone Work, Babbitt Molds, &c., at short notice.

⅛ 3-16 ⅞ No, 3. 1 in. No. 3.
2c. 2c. 4c. 4½ c.

NEW STYLE HAIR LINE GOTHIC.



⅛ 2c 3-16 2c ¼ 2c 5-16 2c ⅜ 2½c

For Hollow Ware and Stove Manufacturers. They are a very light letter, but will show a sharp clean print upon the Castings.

FANCY.

⅜ 3c.
⅝ 4c.
¾ 5c.
⅞ 5c.
1 6c.

½ in. 4c. 1¼ 7.

CONDENSED ROMAN.

A thin Letter.

⅝ in. 3c.
⅞ 4c.
2⅝ 15c.

⅜ 2½c. ½ 2½c.

GOTHIC BRANDING-IRON.

5-16 inch deep. For making Cast Iron Branding Irons.

½ 5c. ⅝ 6c. ¾ 7c. 1 in. 7c.

Roman Style Brands of corresponding sizes and prices with 1¼ inch 8c., and 1½ inch 16c., extra sizes.

⅜ in. 5c.

Discounts as large as any other Manufacturer.

H. W. KNIGHT & SON

BOX 1156.
SENECA FALLS, N. Y.

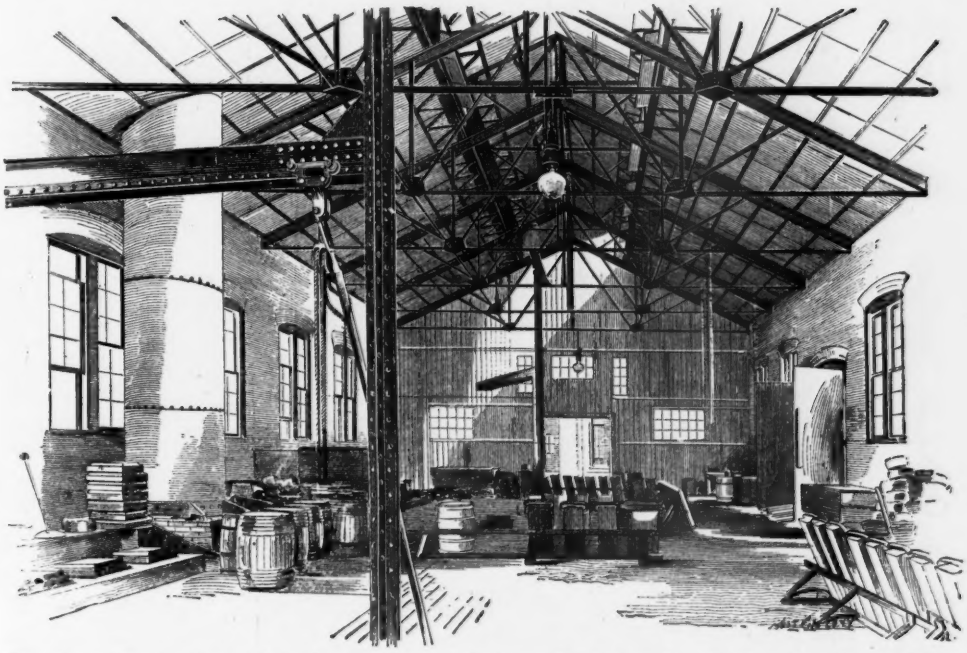
CHAS. M. JARVIS, President and Chief Engineer. BURR K. FIELD, Vice-President.
GEO. H. SAGE, Secretary F. L. WILCOX, Treasurer.

THE BERLIN IRON BRIDGE CO.,

ENGINEERS, ARCHITECTS

—AND BUILDERS OF—

Iron and Steel Bridges, Roofs and Buildings.



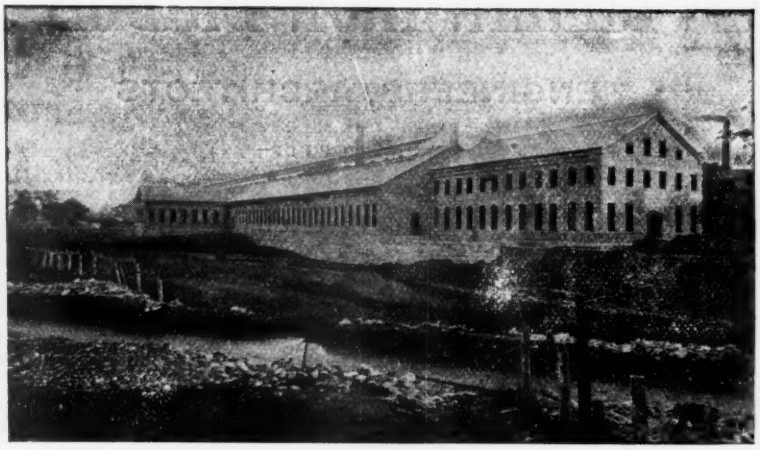
The above illustration, taken direct from a photograph, shows the interior of a Brass Casting Shop, designed and built by us for Randolph & Clowes, at Waterbury, Conn. The building is 42 ft. in width by 83 ft. in length, with brick walls and an iron truss roof covered with our Patent Anti-Condensation Corrugated Iron Roofing. The danger from fire in a Casting shop is very great, hence an iron roof is almost a necessity; but corrugated iron is not adapted for this class of work owing to the condensation from the outside. We guarantee no condensation from a corrugated iron roof constructed under our patent.

Office and Works, - - EAST BERLIN, CONN.

SEND FOR ILLUSTRATED CATALOGUE.

Wrought Iron Bridge Co.,

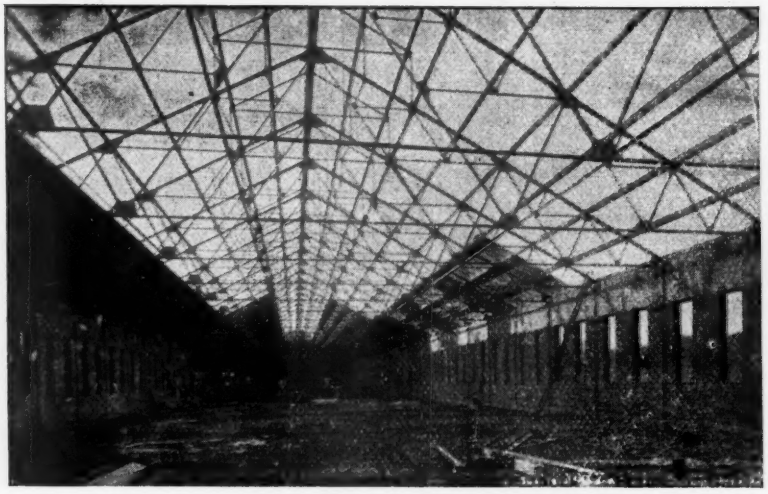
DESIGNERS AND BUILDERS IN
IRON AND STEEL
FIRE PROOF BUILDINGS



FOUNDRIES, MACHINE SHOPS
—FOR—
ETC., ETC.

Exterior of Foundry of Warder, Bushnell & Glessner Co., Springfield, Ohio.

Traveling and Jib Cranes for handling
Heavy Castings and Machinery.



Buildings Designed for Special
Requirements.

Interior Foundry Building of Warder, Bushnell & Glessner Co., Springfield, Ohio.

The roof of this building was erected by the Wrought Iron Bridge Co., Canton, Ohio, and consists of steel trusses supporting wooden purlins to which matched and dressed sheeting is nailed for slating. Trusses being 18 ft. above the floor, the wood work of roof is out of danger from fire, while the cover being of slate a suitable cornice to protect the overhanging of roof from flying sparks, or heat from the burning of neighboring buildings, renders this structure absolutely fire proof. Windows are set in the sides of ventilator throughout its entire length, so that ample light and ventilation is insured.

Wrought Iron Bridge Co.

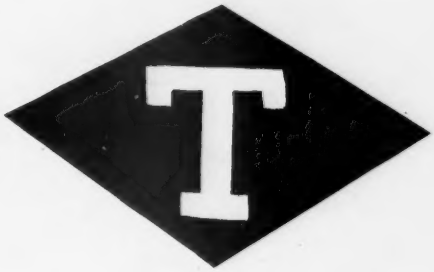
ADDRESS NEAREST OFFICE.

CANTON, O. KANSAS CITY, MO. CHICAGO, ILL.

136 Liberty St., NEW YORK.

A NEW INVENTION!

Tompkins' 'Smooth on Castings' Iron Compound.



WILL stop a hole steam tight or repair a defect in castings and often save 100 times its cost in time and money in repairing defects in cast iron patterns or other castings.

It is prepared in powdered form. For use simply make into a putty with a little water, apply to the defect, in a few hours a chemical change has converted it into iron that can be finished, leaving a smooth surface hard as iron and the same color.

Iron Founders?
Manufacturers of Heavy Machinery?
Manufacturers of Heating Apparatus?

You are missing it bad if you fail to investigate this wonderful compound. Hundreds are now using it. Do you? If not, why not. Sample for the asking. Better still, order a 5 lb. can, it will be a paying investment.

VREELAND TOMPKINS,

MANUFACTURING CHEMIST,

533 COMMUNIPAW AVE., JERSEY CITY, N. J.

MOLDERS!

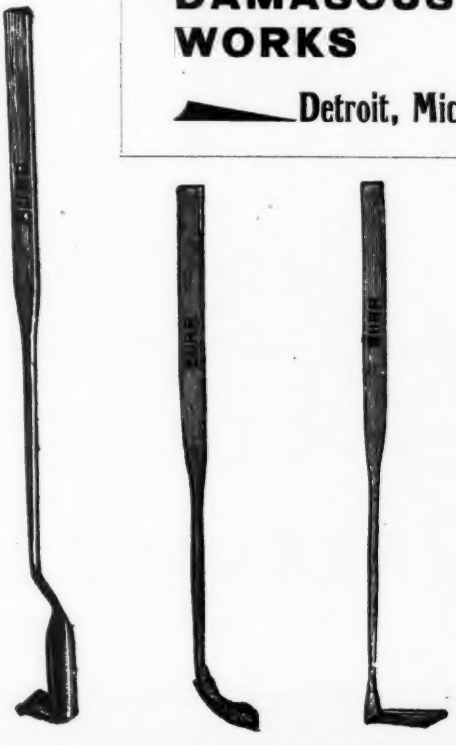
✱ WHEN you want the best tools made in America, insist on having those made by us. They are manufactured from the **Finest Imported Tool Steel,** highly tempered and polished, and require no . . .

BREAKING IN . . . .

They are for sale by all first-class Foundry Supply Houses and Hardware Dealers. If you cannot get them from your supply House or Hardware Dealer, write for illustrated price list . . . . .

BURR'S DAMASCUS WORKS

Detroit, Mich.



ESTABLISHED 1875

STOW M'F'G. CO.

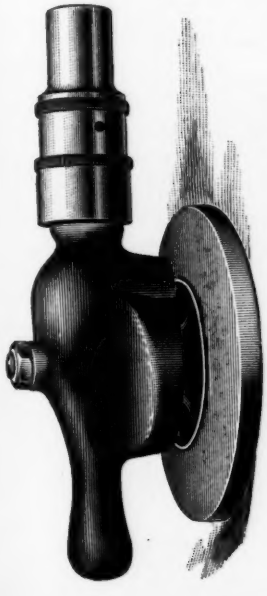
BINGHAMTON, N. Y.

Inventors and Manufacturers of the

Stow Flexible Shaft

——FOR ALL PURPOSES——

Emery Grinding,
Wood Boring,
Drilling, Tapping,
Reaming, Etc.



PORTABLE EMERY GRINDER.

For no tool we manufacture has there been so rapidly increasing demand as for our **Portable Emery Grinder**. It is giving perfect satisfaction to hundreds of our customers. For cleaning and grinding heavy castings, for buffing and polishing all metals and glass it is almost indispensible, and a great time and labor saver. The above cut shows the tool running emery wheel on edge—below we illustrate our appliance which is to be substituted for the clamp spindle when grinding, shaping and polishing flat surfaces.

Write for Catalogue and Price List.

STOW M'F'G. CO

BINGHAMTON, N. Y.

GLUTROSE

(TRADE MARK.)

THE UNIVERSAL LIQUID CORE COMPOUND. PATENTED IN THE UNITED STATES, ENGLAND, FRANCE, AND BELGIUM.

Glutrose was invented and is manufactured by a practical foundryman of many years' experience. Its merits are an established fact, and it has been used in the Pennsylvania Railroad foundry at Altoona, and other large foundries for the past three years with the most satisfactory results.

Economy of Glutrose.

Glutrose is cheaper than flour, oil, or any other core compound used. One 50-gallon barrel will go as far as three barrels of the best flour. Will keep any length of time, and improves with age.

Never varies in quality, whilst flour is always varying.

Claim for Glutrose.

Glutrose makes the most diffcult and complicated Cares for Iron or brass Castings of any size.

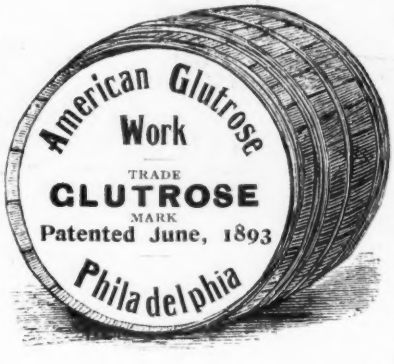
Makes a good, strong Core, keeping thin places and corners sharp and strong.

Dries open and porous inside and hard on the inside, yet the metal will lie well to it.

Makes excellent cores out of burnt sand, enabling foundries to use iheir sand over and over, thereby saving the expense of buying new sand and carting the old away.

Never spoils your Castings by *blowing.*

Cannot be *wasted,* as when too much it used, making the sand too wet to work well, *more dry sand* must be added, thus correcting the fault without waste.



Leaves the Castings smooth and cores come out easily.

Does *not readily* absorb *moisture* from the mold.

Never *varies* in strength or condition.

Makes no offensive smell or smoke.

Will *never* blow the Castings.

Will *never make the Core larger than the core-box.*

Will let the air and gases off from a Core which is difficult to *vent,* better than any other material in use.

Here is a Sample of Hundreds of Letters.

A Whitney & Sons, Car Wheel Works, Callowhill, 16th and 17th Streets.
Philadelphia, Pa., July 22d, 1895.

American Glutrose Works—GENTLEMEN: Replying to your request for a testimonial as to the merits of Glutrose Core Compound, would say that we have used it exclusively for our cores since 1893, and have every reason to be satisfied with it, both as to its economy and with the results attained with a minimum amount of trouble in mixing. We trust you will be successful in its sale.

Yours truly,

A. WHITNEY & SONS, per Thos. B. Whitney.

. . . References . . .

PENNSYLVANIA RAILROAD, Altoona, Pa.
PENNSYLVANIA IRON WORKS, Philadelphia.
GRAY'S FERRY IRON FOUNDRY, Philadelphia.
COX & SONS CO., Bridgeton, N. J.
ATWOOD & MCCAFFREY, Pittsburg.
FLINT, WALLING & CO., Kendallville, Ind.
THE JOHNSON COMPANY, Johnstown, Pa.
KINTZER & JONES, Pittsburg.
PUSEY & JONES, Wilmington, Del.
WILLIAMSPORT MACAINE CO., Williamsport, Pa.
HYDRULIC MACHINE CO., Pittsburg.
G. REBMANN & CO., Philadelphia.
NATIONAL MALLEABLE CASTING CO., Cleveland, O.
HARRISBURG FOUNDRY AND MACHINE CO., Harisburg, Pa.

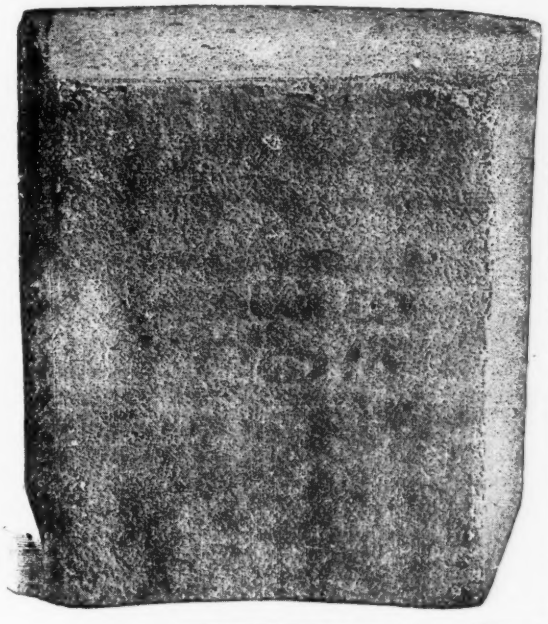
Send for Samples and Price.

AMERICAN GLUTROSE WORKS,

Offices, Penn Mutual Building,
925 Chestnut St., Philadelphia.

. . . Factories . . .
Camden, N. J.; Merchantville, N. J.

WHISKEY AND HORSES



TWO Products of Kentucky which have made the State famous. Another product of great merit is the

OLIVE HILL FIRE CLAY

From which our . . .

CUPOLA BLOCK

is made. This block will outwear any of them, and, since we have introduced it, everybody else has jumped in and advertised Cupola Blocks, but others have not the "staying" qualities which ours possesses. They stand both FRICTION and HEAT and are made in sizes to fit the shells of all standard Cupolas. Read the evidence below:

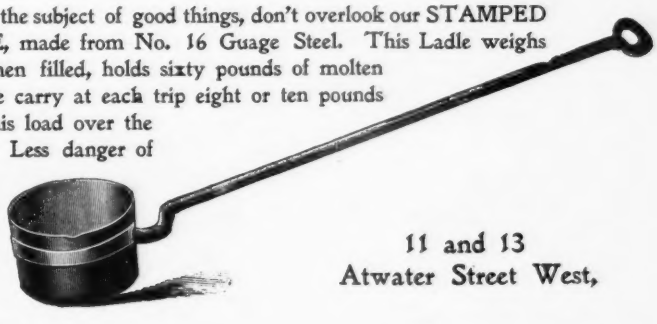
OFFICE OF CLEAVELAND FENCE CO., 18-22 Biddle St.,
INDIANAPOLIS, IND., December 4th, 1895.

F. B. Stevens, Detroit, Mich.:

DEAR SIR—In reply to your inquiry as regards your Cupola Block and the Empire Crown Circle Brick, would say, about a year and a half ago, we had you make us some Circle Brick of a special size from your Empire Crown Clay, which gave good results, and after these burnt out, we thought it advisable to have your large COLLIAU CUPOLA BLOCK, which has been in since and we cannot speak to highly of them. You can certainly use our opinion in print if it will be of any use to you.

Respectfully,
CLEVELAND FENCE CO.,
(Signed) H. G. BRYAM, President.

WHILE YOUR MIND is on the subject of good things, don't overlook our STAMPED STEEL HAND LADLE, made from No. 16 Guage Steel. This Ladle weighs but three pounds and when filled, holds sixty pounds of molten metal. A molder can therefore carry at each trip eight or ten pounds more iron without increasing his load over the old cast iron ladle when full. Less danger of accident, WITHOUT EXTRA COST. Write for prices and let us quote you on a full line of FACINGS and FOUNDRY SUPPLIES.



11 and 13
Atwater Street West,

F. B. STEVENS, DETROIT

P. G. COCHRAN, Pres.
J. R. LAUGHREY, Treas.

JOHN H. WURTZ, Secretary
J. S. NEWMYER, Mgr.

Washington Coal & Coke Co

(CAPITAL PAID-UP $250,000.)

MANUFACTURERS OF

HIGH GRADE COKE

We Make a specialty of 72 Hour
Foundry Coke.

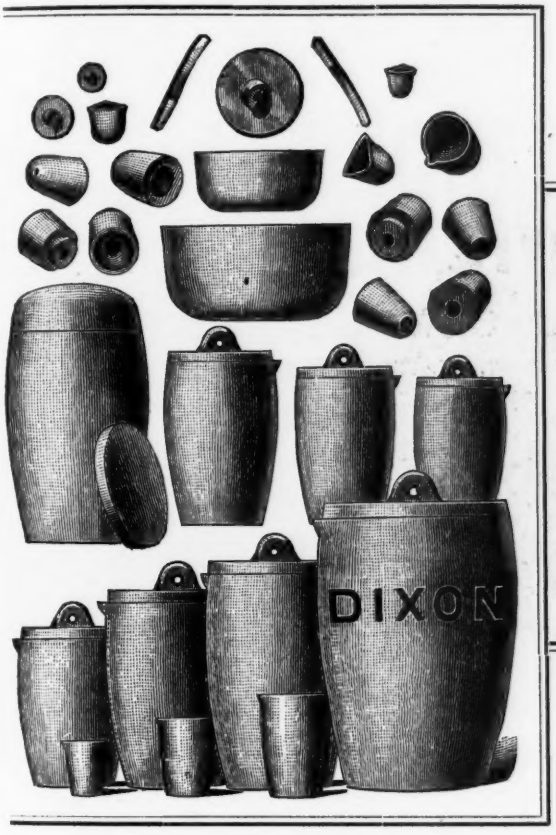
N. P. HYNDMAN, Sales Agent,

Room 8, Conestoga Building, 7 Wood St.

General Office, DAWSON, PA.

PITTSBURG, PA.

DIXON'S



CRUCIBLE MIXTURES

Have been famous since 1827 and are steadily growing in popularity. Dixon's Retorts, Crucibles, Stoppers, etc., are the result of scientific study and most skilled workmanship. Different mixtures are made for different work, under the direct supervision of able chemists, and for durability and uniformity Dixon's Mixtures are unequaled and the most economical. . . . . .

SEND FOR CATALOGUE AND PRICES.

JOS. DIXON CRUCIBLE CO.,

SEND FOR CATALOGUE "C." JERSEY CITY, N. J.

SHERRY TORCH

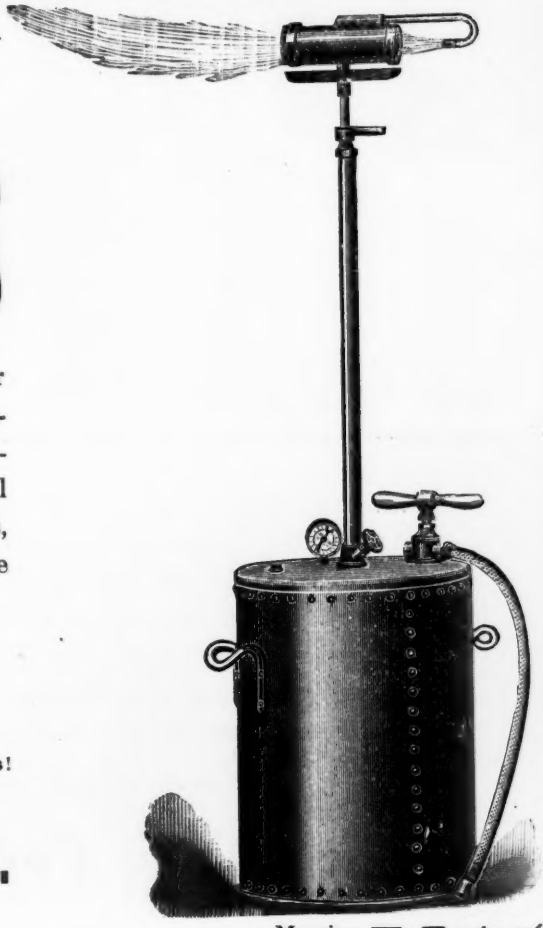
MORE

SIMPLE!
EFFICIENT!
PORTABLE!
RELIABLE!
EASILY OPERATED!
AND CHEAPER!

100 TO 4,000 CANDLE POWER,

GIVING A CLEAR, WHITE LIGHT.

Indispensible in all places where a Powerful and Portable Light is required.



. . FOR . .

FOUNDRIES

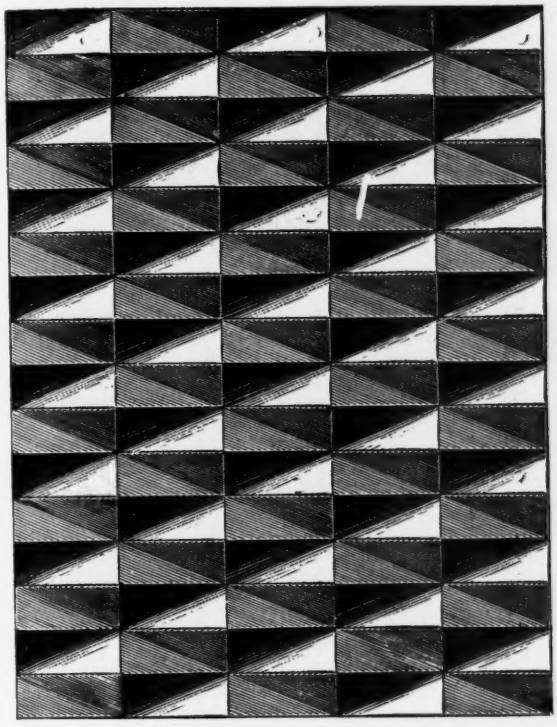
Boiler Makers, Bridge and Girder Works, Rolling Mills, Forges, Contractors and Builders, Stone Quarries, Ship Yards, Dry Docks, Coal Wharves, Harbor Works, Saw Mills, Dredgers, Street Railways, Bridge Building.

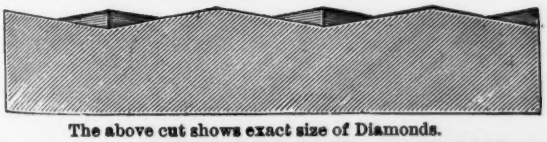
Requires No Skilled Labor!
Unaffected by Wind or Rain!
Can be Started in a Few Minutes!

Sherry Torch Co.

ROCHESTER, N. Y.

Mention THE FOUNDRY.





The above cut shows exact size of Diamonds.

Diamond Pattern Lumber,

—FOR—

DOOR SILLS, PLATFORMS, STEP PLATES, Etc.

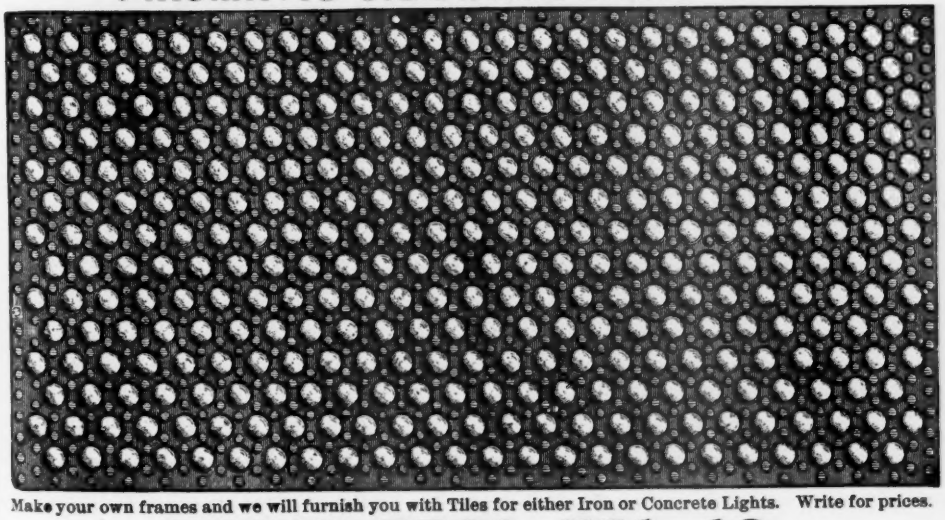
This Patent Lumber is made by a Special Machine invented by us, the ONLY Machine of its kind, and each piece will match PERFECTLY with all other pieces, by "joining" the edges to the centre, lengthwise, or any row of Diamonds.

Size of each piece, 8 feet long by 6 inches wide, and ½ inch thick. Price 10 cents per running foot of 6 inches in width, NET CASH crated and delivered f. o. b. Chicago, in orders of not less than 6 pieces. Send for sample.

BROWN BROS. MFG. CO.

Cor. Clinton and Jackson Sts. Chicago.

PRISMATIC SIDEWALK LIGHT TILE.



Make your own frames and we will furnish you with Tiles for either Iron or Concrete Lights. Write for prices.

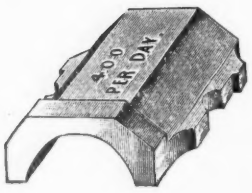
BROWN BROS. MFG. CO.,

Mention THE FOUNDRY. **Cor. Jackson and Clinton Sts. CHICAGO.**

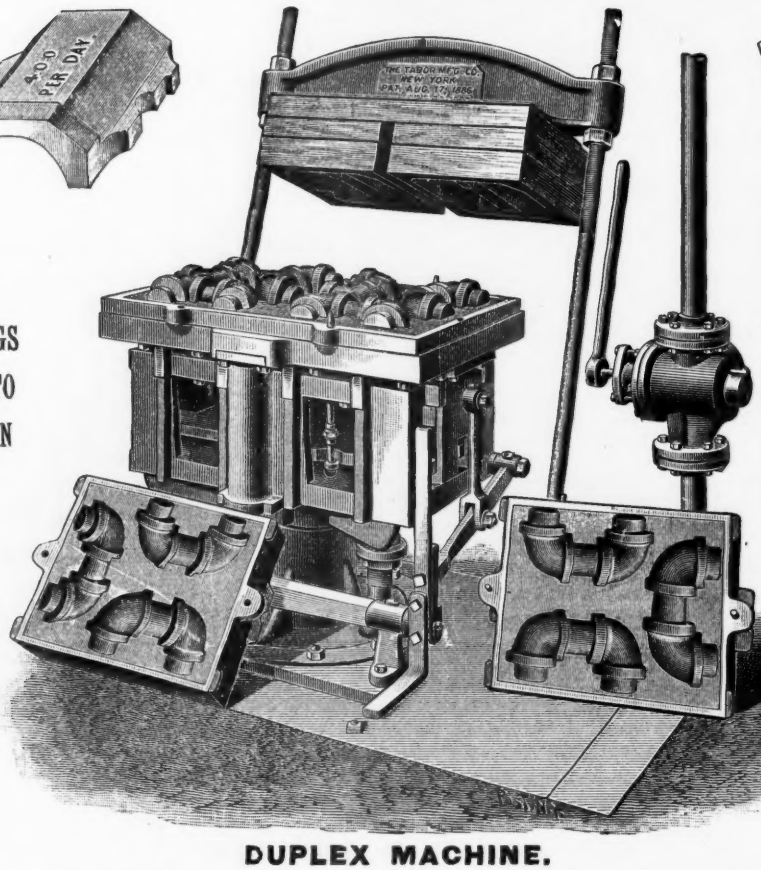
ONE MAN'S WORK

—WITH THE—

TABOR AUTOMATIC MOLDING MACHINE



AND
POURS
CASTINGS
TRUE TO
PATTERN



MOLDS
DO NOT
BLOW

DUPLEX MACHINE.

Molds both parts of flask at one operation of machine, thus making two machines in one.

These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

The Tabor Manufacturing Co.

39 Cortlandt Street,

NEW YORK, - - - N. Y.

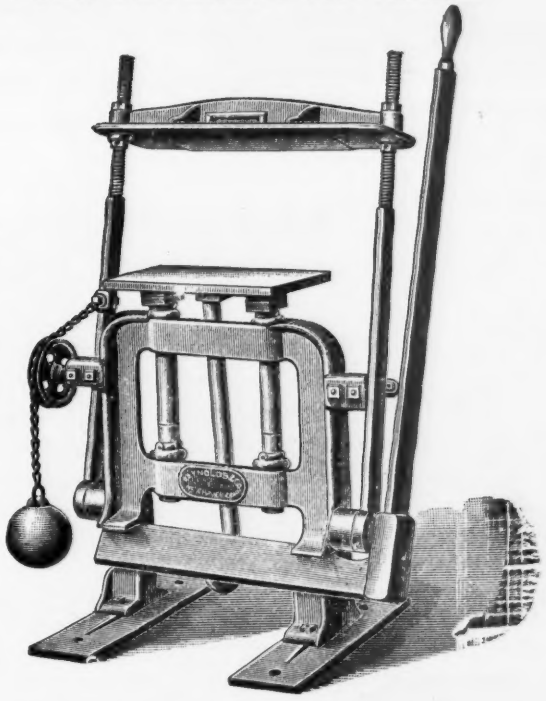
REYNOLDS & CO.,

MANUFACTURERS OF

MOLDING MACHINES

FOUR DIFFERENT PATTERNS.

Our Machines can be Found in Almost Every City in the Union



If You Want to Save Money on Your Present Cost of Production, Write Us.

Have you any idea to what extent these Machines are in use by the most successful Firms?

Look at this list of a few of our principal customers and the number of machines they have in use:

	No.		No.
National Malleable Casting Co	787	Taylor & Boggis Foundry Co., Cleveland, O	44
Eberhard Mfg. Co., Cleveland, O	205	McConway-Torley Co., Pittsburg, Pa	39
Naugatuck Malleable Iron Co., Naugatuck, Conn	190	Moline Malleable Iron Co., Moline, Ill	34
Bridgeport Malleable Iron Co., Bridgeport, Conn	130	Eaton, Cole & Burnham Co., Bridgeport, Conn	31
Malleable Iron Fittings Co., Bradford, Conn	100	P. Hayden Saddlery Hardware Co., Columbus, O	30
Russell & Erwin Manuf'g Co., New Britain, Conn	94	Wheeler & Wilson Manfg., Bridgeport, Conn	29
Peck, Stow & Wilcox Co., Cleveland, O	94	Union Foundry and Pullman C. W. Works, Chicago	27
Wisconsin Malleable Iron Co., Milwaukee, Wis	84	Indianapolis Foundry Co., Indianapolis, Ind	26
Missouri Malleable Iron Co., St. Louis, Mo	70	Dayton Malleable Iron Co, Dayton, Ohio	26
Sessions Foundry Co., Bristol, Conn	68	Lockwood Mfg. Co., South Norwalk, Conn	26
Crane Company, Chicago, Ill	68	Union Malleable Iron Co., Moline, Ill	25
Standard Foundry & Mfg. Co., Cleveland, O	64	Sweet and Clark Co., Marion, Ind	25
Troy Malleable Iron Company, Troy, N. Y	55	Bradley & Hubbard Mfg. Co., Meriden, Conn	20
Reading Hardware Co., Reading, Pa	52	Arcade Malleable Iron Co., Worcester, Mass	18
Springfield Malleable Iron Co, Springfield, O	51	Joel Hayden Brass Co., Lorain, O	18
Singer Manufacturing Co, Elizabethport, N. J	50	Erie Malleable Iron Works, Erie, Pa	15
S. J. Meeker, Newark, N. S	45	J. L. Jackson, Saginaw, Mich	15

You should see some of the letters these concerns have written. You would be surprised.

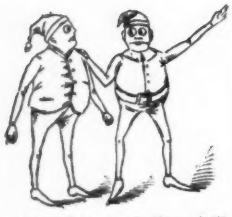
REYNOLDS & CO.,

323 EAST STREET, - - NEW HAVEN, CONN.

Just stop right here!

This cut made from Photo of 1-2 Inch Test Bar poured direct from furnace with Clinton Iron and twisted.

We are going to talk business—straight! and want this "ad" read carefully.



"You'd better believe it!"

AS a foundryman, you know (from bitter experience probably) that everything you make is sold on inspection, "Yes, that is so," we hear you say. How much of the material you use is **inspected?** Think carefully before answering that. Well, we know your answer and ask another question. Do you think it pays to buy an uninspected raw material to make it into a rigidly inspected product?

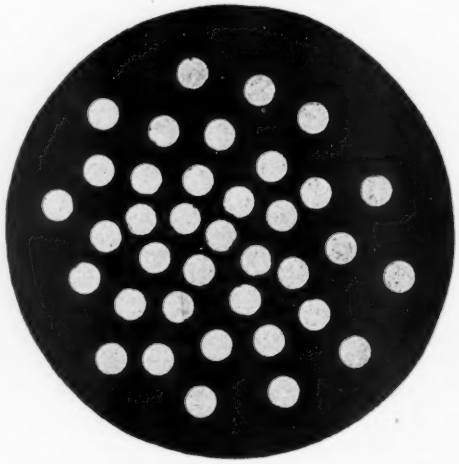
The foregoing is educational, the following is practical.

Every car of

HECTOR and CLINTON

Foundry Iron is inspected. (Our Chemical and Physical Laboratory is One of the Largest in the World.) We use only the best material, watch every point in its manufacture and the result most carefully, and when we sell a car of iron, we know just what we are delivering.

That accounts for the reputation our iron has made wherever used and the complimentary letters we receive almost daily.



This cut reproduced from Photo of a Plate poured with Clinton Iron direct from blast furnace; size, 4 3-8 x 1-8 thick. The 41 1-4 inch holes were punched out cold without cracking it.

Clinton Iron and Steel Co.

PITTSBURG, PA.

15 Cortland St., N. Y.

DIRECTORY OF LEADING PIG IRON DEALERS.

HUGH W. ADAMS & CO.

Pig Iron Merchants

15 Beekman Street, NEW YORK

Boston Office, 85 Water Street

HENRY H. ADAMS & CO.

(Incorporated)

PIG IRON

"NORWAY" for Strength,
"HECTOR" for Softness

177 Broadway,
NEW YORK CITY, N. Y.

MATTHEW ADDY & CO.

CINCINNATI, ST. LOUIS.

Agencies,

Chicago, Detroit, New York,
Philadelphia.

CLINTON IRON & STEEL CO.

Manufacturers of the

CLINTON INSPECTED FOUNDRY IRON

CELEBRATED "CLINTON" SOFTENER

PITTSBURG, PA

15 Cortlandt St., NEW YORK.

DAYTON COAL & IRON CO.

(Limited.)

PIG IRON.

DAYTON, Tenn. CINCINNATI, Ohio.

F. A. GOODRICH & CO.

Incorporated

PIG IRON, STEEL, COKE, ETC.

Detroit, Mich.

MACFARLANE & COMPANY,

Pig Iron and Coke,

LOUISVILLE, KY.

R. C. Cantelou, Manager

Chicago Office: 1531 MONADNOCK

PICKANDS, BROWN & CO.,

Manufacturers, Importers
and Dealers in

PIG IRON AND IRON ORE.

Rookery Building, CHICAGO.

ROGERS, BROWN & CO.

CINCINNATI, CHICAGO,

BUFFALO,

PHILADELPHIA, NEW YORK

ST. LOUIS

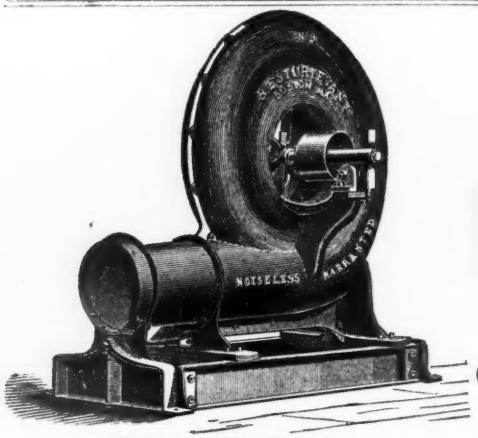
SLOSS IRON & STEEL CO.

BIRMINGHAM, ALA.

SLOSS PIG IRON

D. L. Cobb, Sales Agent

1145 Monadnock Block, CHICAGO, ILL



Blower on Adjustable Bed.

THE STURTEVANT STEEL Pressure Blowers,

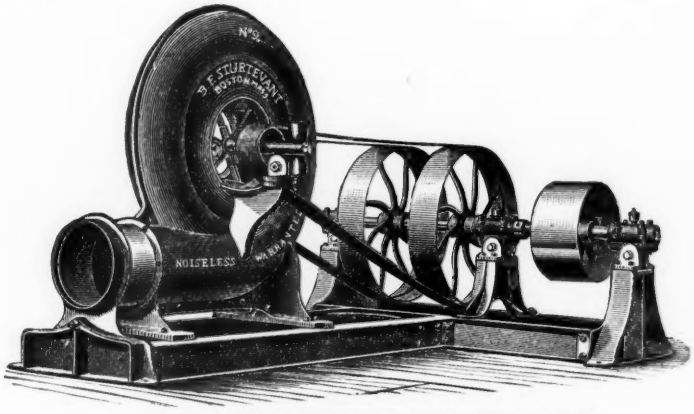
—FOR—

Cupola Furnaces and Forge Fires.

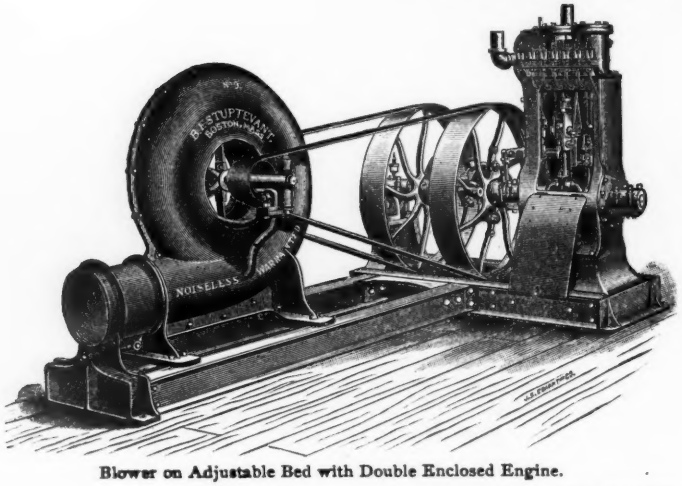
BLOWERS

Furnished without Bed with Separate Countershaft

BLAST GATES



Blower on Adjustable Bed with Combined Countershaft.



Blower on Adjustable Bed with Double Enclosed Engine.

BLOWERS

WITH

THE STURTEVANT

Direct Connected

Electric Motors

Send for Catalogue.

B. F. STURTEVANT CO.,

BOSTON, MASS.

91 Liberty Street, NEW YORK. 135 N. Third St. PHILADELPHIA.
16 S. Canal St. CHICAGO. 75 Queen Victoria St. LONDON.

STOCK CARRIED AT BRANCHES.

PIG IRON

It is our habit to advertise

OUR brands and not ourselves, but the Editor of "The Foundry" says this issue is to go into every foundry in the United States and some in foreign countries, and we cannot resist the temptation to write a few lines of a personal nature. We have customers from Nova Scotia to Oregon, and from the Great Lakes to the Gulf. Our business has grown during the past fifteen years to its present proportions by reason of our not devoting efforts merely to selling iron and getting a commission, but to ascertaining by analysis and physical tests the best mixtures that can be made at lowest cost. We are the only sellers who have carried on a series of tests, and have thrown open a chemical laboratory free for the use of our customers. It matters not whether you want to make hardware or grate-bars, water pipe or car wheels, malleable castings or floor plates, steam engines or bar iron, steel castings or stoves, or anything else into which pig iron enters, we are prepared to ship the quality and grade required.

We duly appreciate the favor of our friends who send in orders for 5,000 to 10,000 tons at a time, but we want it understood that the business of the car-load buyer also has our careful attention. Our outfit is large enough to look after the interests of all, and a trial order from those who have not been purchasing from us, will convince them.

Our tonnage for 1895 largely exceeds any previous year, and with the help of our friends we want 1896 to show an increase of 50 per cent.

We have a larger line of furnace agencies and are better equipped than any other house in the world to supply pig iron of all grades and qualities.

AGENCY BRANCHES.

Rogers, Brown & Co., Buffalo—Resident Partner, Wm. A. Rogers.
Rogers, Brown & Co., New York—Resident Partner, Archer Brown.
Rogers, Brown & Co., Chicago—Resident Partner, M. Cochrane Armour.
Rogers, Brown & Warner, Philadelphia.
Rogers, Brown & Meacham, St. Louis.
Rogers, Brown & Co., Boston—F. G. Gibbs, Resident Agent.
Rogers, Brown & Co., Cleveland—Geo. K. Hosford, Resident Agent.
Pittsburg—H. M. Hooker, Resident Agent.
Providence, R. I.—M. J. Henehan, Resident Agent.

Rogers, Brown & Company

PRINCIPAL OFFICE

WM. C. HERRON, D. B. MEACHAM } RESIDENT PARTNERS.

CINCINNATI

See next page for list of Irons.

PIG IRON

FOR MOST OF THE BRANDS NAMED BELOW WE ARE SOLE AGENTS, BUT FOR SOME OF THEM HAVE ONLY PARTIAL TERRITORY . . . . .

SOUTHERN COKE.

Alice	2 stacks
DeBardeleben	7 "
Ensley	4 "
Sewanee	1 "
Sheffield	3 "
Sloss	4 "
So. Pittsburg	3 "
Watts	2 "

SOUTHERN SOFTENER.

Spathite	1 stack

NORTHERN COKE.

Belfont	1 stack
Calumet	2 "
Douglas	2 "
Lincoln	1 "
Niagara	2 "
Port Henry	1 "
River	1 "

PENN. COKE.

Crane	4 stacks
Nittany	1 "
Scottdale	1 "

VIRGINIA COKE.

Big Stone Gap	2 stacks
Shenandoah	1 "

LAKE SUPERIOR CHARCOAL.

Hinkle	1 stack.

SOUTHERN CHARCOAL.

Rome (Car Wheel)	1 stack
Jenifer (Car Wheel)	1 "
Mannie (Softener)	2 "
Round Mountain (Cold Blast)	1 "
Napier (Foundry)	1 "

HANGING ROCK CHARCOAL.

Centre	1 stack
Mt. Vernon	1 "
Olive	1 "
Hecla (Cold Blast)	1 "
Jefferson (Cold Blast)	1 "

SILVERY SOFTENERS.

Star	1 stack
Tropic	1 "

MISSOURI CHARCOAL.

Midland	1 stack
Sligo	1 "

In addition to brands named above, we can furnish numerous others if desired.

We sell the best makes of genuine CONNELLSVILLE, POCAHONTAS AND NEW RIVER 72-HOUR FOUNDRY COKE.

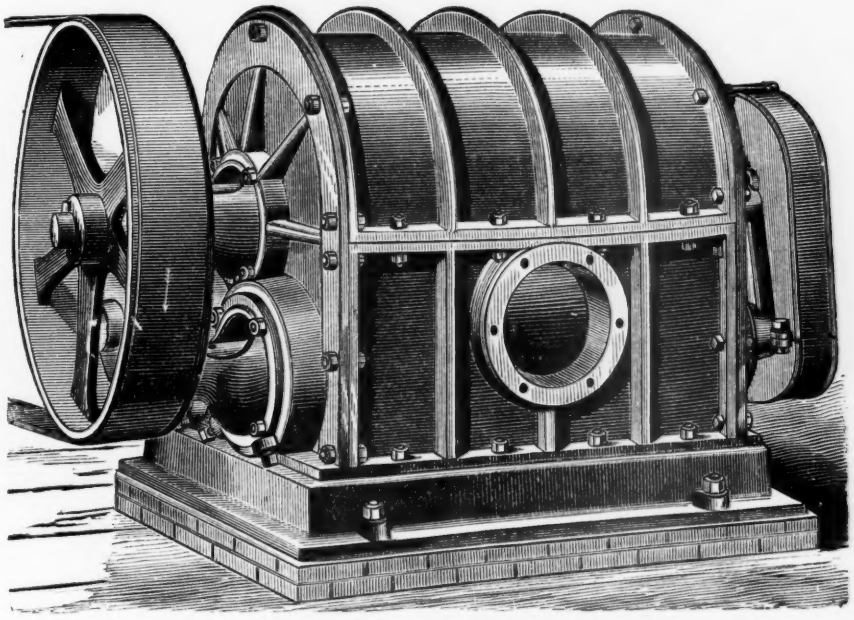
Rogers, Brown & Company

See preceding page.

CINCINNATI, O.

The Baker Rotary Pressure Blower

ONLY ONE BELT IS REQUIRED TO DRIVE THE LARGEST BLOWER.



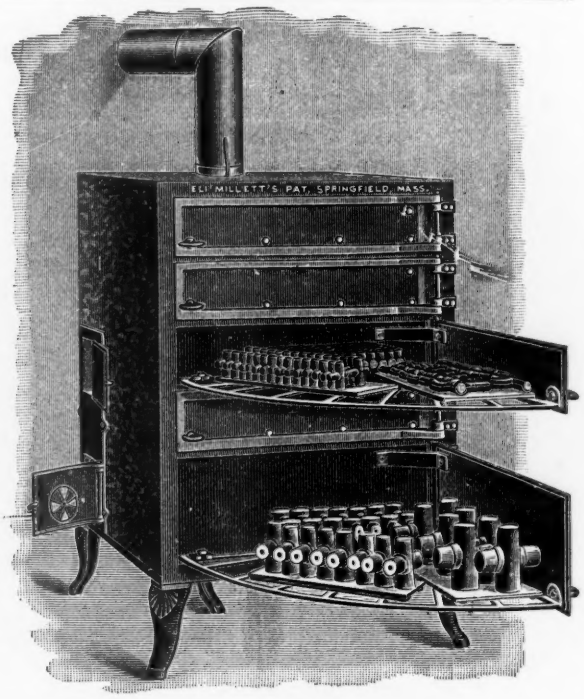
The Best POSITIVE PRESSURE BLOWER for IRON FOUNDRY CUPOLAS, Pneumatic Tubes, Water Gas Works, Smelting Silver, Lead, or Copper Ores, Sand Blast, Forge or Knobling Fires, Ventilating Mines or Tunnels or any other purpose requiring a POSITIVE BLAST OR EXHAUST.

Wilbraham Baker Blower Co.,

2518 Frankford Ave., PHILADELPHIA, PA.

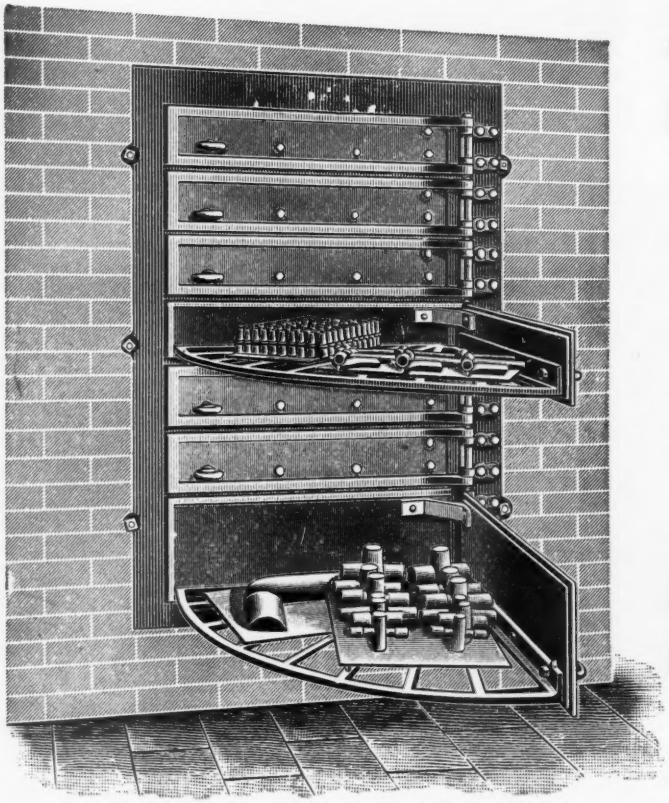
Ever get in a Hurry for a Core?

Perhaps a small one,
Perhaps not so small.



The "MILLETT"

Is simply the greatest Time and Money Saver you can have in your foundry.



WE CAN PROVE IT

Will ship on thirty days trial, return if not pleased.

Hundreds in use and Thousands of Dollars being saved annually, not to mention comfort and better work.

Millett Core Oven Co.

BRIGHTWOOD,
MASS.

TALK ABOUT

SNAPS

Did You Ever Read or Hear of Anything Like This?

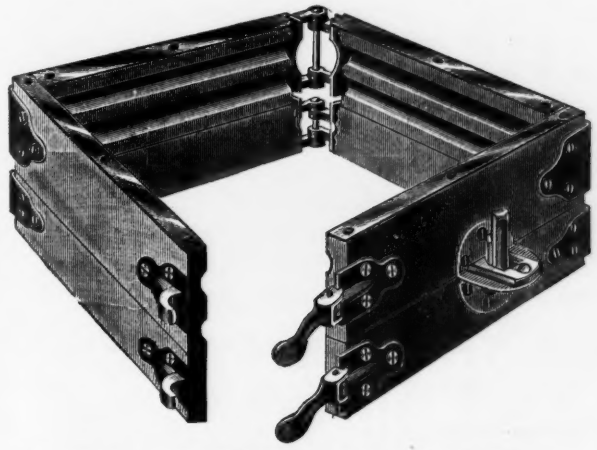
We are the Largest Manufacturers of

SNAP FLASKS

. . . . In this Country, for Two Reasons.

First—Our Flask has been found to be the best in the market and foundrymen insist upon having them, no matter who they buy of.

Second—Making them in such large quantities and using the most improved machinery enables us to sell them cheap.



That is all there is to it—
QUALITY and PRICE.

Made by skilled mechanics out of the best kiln-dried lumber and with all malleable iron fittings.

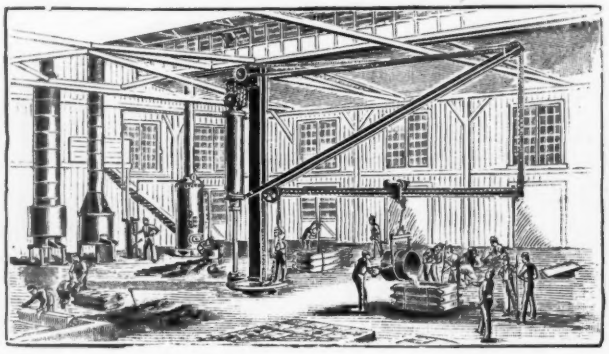
Here are our prices for standard sizes:

1 in. Natural White Wood,	$2 00
1 1-2 in. " " "	2 25
1 in. Hard Wood	2 25
1 1-2 " "	2 50

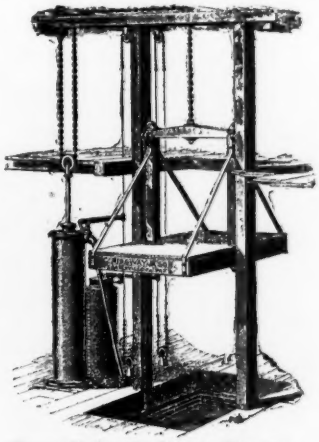
Three Part Flasks, $1 extra.

If you desire discounts, write us and mention *The Foundry*.

C. H. GREEN & CO. 1400 GRAPE STREET. **Syracuse, N. Y.**



5-ton Ridgway Crane in a Foundry.



Steam Hydraulic Cupola Elevator.

TALK . . . ABOUT . . CHRISTMAS PRESENTS!

WELL, the Foundrymen of this country never got such a present as the Ridgway Balanced Steam Hydraulic Crane. Just stop and think what it means to have a machine in the foundry like this :

The same Molders with the same wages do 50 per cent. more work than with any other crane,

And there are no ifs and buts about it either, for we send you right to the people who are using them and you can find out for yourself if you want to.

Havn't you yet found out that this crane is the most wonderful machine ever put into a foundry? Where in the world have you been all year? The best shops all over the land are getting them and making money hand over fist with them. If what we say is true you can well believe that, can't you? Well it won't take long to find out if you have postage stamps.

If the Foundrymen who read this paper could just realize what a machine this was for their business, twenty shops like ours couldn't make them fast enough. A man's an idiot that don't investigate a machine that makes such claims as we do and show a list of users as long as your arm to back them up.

Begin the New Year by investigating. We have the usual literature

"PLEASE TAKE THE ELEVATOR"

GREATEST STOCK HOIST KNOWN.

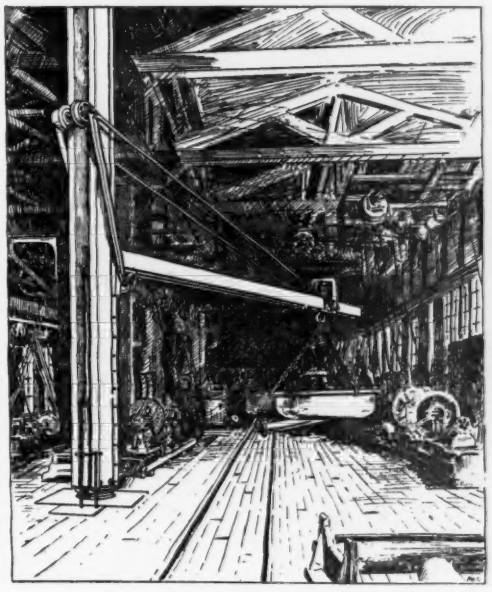
CRAIG RIDGWAY & SON,

COATESVILLE, PA.

The Addyston Pipe and Steel Co.

CINCINNATI, O.

WE MAKE CRANES



DO YOU NEED CRANES

ASK US FOR OUR PRICES ON CRANES.

With our Special Tools we make FLANGE PIPE at low cost.

LET US NAME YOU PRICES
WHEN YOU REQUIRE

CAST IRON, FLANGE OR HUB PIPE OR FITTINGS.

We may be able to supply them to you at less than your cost.

The Addyston Pipe and Steel Co.

CINCINNATI, OHIO.

JOHN J. SHIPHERD, Pres. W. RUSSELL, Vice-Pres. and Mgr.
L. C. SHIPHERD, Sec'y and Treas.

THE

Phoenix Iron Works Co.

The following is a letter which was sent to us unasked for and is a sample of many genuine indorsements which we receive very frequently.

OFFICE OF
BERT. L. BALDWIN, M. E.
CINCINNATI, O.

PHOENIX IRON WORKS CO.
CLEVELAND, OHIO.

GENTLEMEN—As you may remember, you furnished a 10 ton traveling Crane which was erected at the Cummingsville Generating Station for the Cincinnati Street Ry. Co. This crane was erected for the purpose of handling the heavy parts of the Railway Generators. The easy working of this crane was appreciated by the party, who had the contract for erecting the generator, who found that where it required eight men at the hoisting chain of one of our other cranes, it only required three at your crane, with both cranes handling the same load. All of the details on this crane are well worked out and substantial, so that I expect that it will continue to give us the best satisfaction.

Yours respectfully,
(Signed) BERT L. BALDWIN.

MANUFACTURERS

Hand, Steam, Belt, Hydraulic and Electric Cranes

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Foundry Ladles, Chains, and General Machinery

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The Edw. P. Allis Co.

Milwaukee, Wis. have the largest foundry (exclusively for machinery castings,) in the United States. Its interior is shown by the following cut. . . . .

The daily melt is from 60 to 90 tons. All the heavy work is done under and handled by **THREE** thirty ton

Shaw Electric Traveling Cranes,

The first of which was put in operation in 1889, the second in 1891 and the third in 1893. Besides these, there are three more Shaw Cranes in the erecting and machine shops.

These Crane are Made Only by

THE SHAW ELECTRIC CRANE CO.

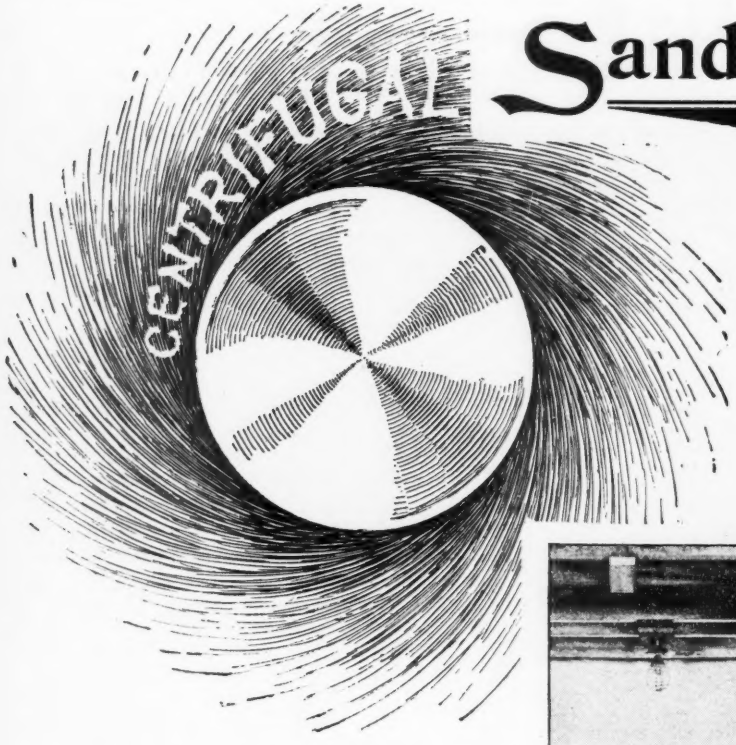
MUSKEGON, MICH.

——And Sold Only by——

Manning, Maxwell & Moore,

424 TELEPHONE BUILDING, PITTSBURG.

60 S. CANAL ST., CHICAGO, ILL. **111 LIBERTY ST., NEW YORK.**



Sand Mixer

IT IS

EFFECTIVE
EXPEDITIOUS
ECONOMICAL

IT SAVES

TIME
LABOR
MONEY

A new, simple and practical method of **preparing Sand for Molds or Cores,** superseding the old time methods of drying and riddling. Damp Sand is in just the proper condition for working.

The saving in labor alone soon repays the cost of the apparatus.

☞NOTE.—We have used this new appliance in our foundry for more than two years with great satifaction; other large establishments have obtained machines from us, and we are now prepared to offer them to foundries and to give full information on application to . . .

William Sellers & Co., Incorp.

PHILADELPHIA.

Just Enough Wind

and at the right pressure for the best results is what you obtain with a

Roots' Positive Pressure Blower.

OUR CATALOGUE is Interesting.
OUR TESTIMONIAL SHEET Convincing.

Do You Want Them?

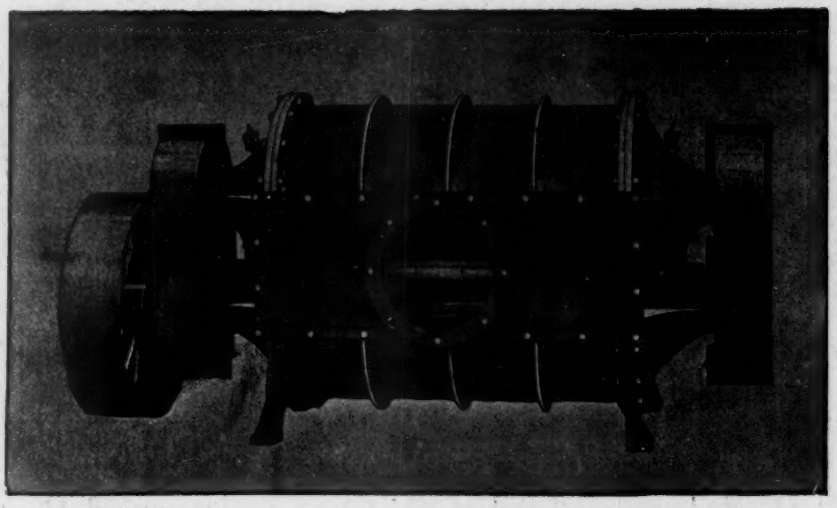
P. H. & F. M. Roots Co.,

Connersville, Indiana.

25,000

Roots' Positive Pressure Blowers

Have been put on the market.



The Resultant
From Thirty-five Years Experience.

P. H. & F. M. ROOTS CO.,

CONNERSVILLE, IND.

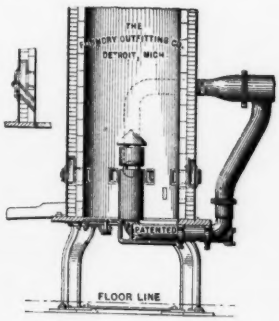
Cupola Furnaces
Blowers
Cranes
Compressors
Hoists
Elevators
Foundry and
Core Oven Cars
Ladles
Reservoirs
Tumbling Mills

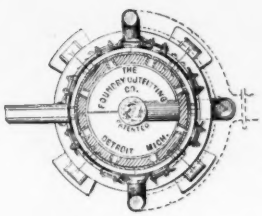
The CRANDALL IMPROVED CUPOLA

..WITH..

Johnson Patent Center Blast Tuyere.

"There are Others" and we are glad of it. They are useful for purposes of comparison.



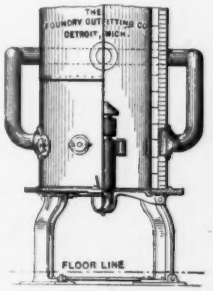


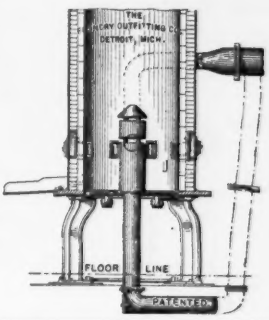
IN TEN YEARS the Center Blast will be the only style of Cupola in use, and the old method of trying to force air into a cupola through the sides will be obselete.

JUST THINK OF IT, the saving effected in time, fuel and better iron melted in the "Crandall," over cost of production in cupola of any other make will pay for it in a few months.

Less Fuel and Blast Needed
More Rapid Melting
Hotter Iron

than can be secured from other styles. We have all sizes—Can be attached to cupola of any make.





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Foundry Lights
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"Everything Used in a Foundry."

WRITE US,

The Foundry Outfitting Co.

DETROIT, MICH.

All the year 'round

The beginning of economy in a foundry is in the Cupola. If it is bad, you are burning up money in the form of unnecessary fuel every day in the year. If you have it to burn, all right—but the Whiting will save you some of it. A daily holiday present. Testimony, sales and results are the proofs. Our circular tells you the rest. If you want Ladles, Trucks, Cranes, Air Hoists, Tumblers, etc.—write us.

WHITING FOUNDRY EQUIPMENT Co

1522 MONADNOCK BLOCK,

CHICAGO.

Over forty Whiting Cupolas in Chicago. Nearly thirty in New York City.

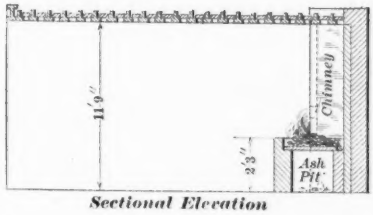
THE FOUNDRY

VOL. 7. DETROIT, MICH., DECEMBER, 1895. No. 40

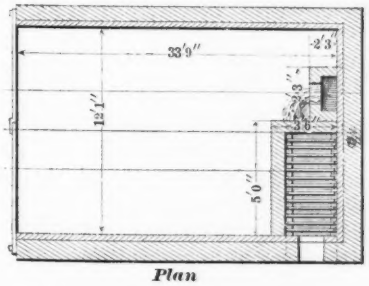
How I Improved a Foundry.

S. GROVES, M. E.

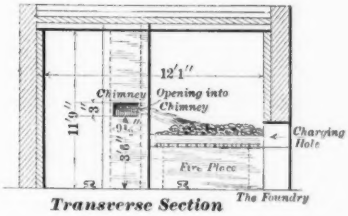
A BITING north wind—laden with the cold of Canadian snow—was blowing down the river, as I crossed the threshold of the ——— Foundry one March day in 1894. I had just left the finest Foundry and machine shop in the states, and it looked like a degredation to pitch one's tent here; for a more dismal, desolate, God-forsaken plant I had never seen—it chilled every nerve fibre in my body. But the thought of difficulties to surmount and the glory of bringing order out of chaos made my anglo-saxon blood course through my veins again, so inside I went, and this is what I found.



Sectional Elevation



Plan



Transverse Section

Core Oven as designed by a Machinist and Conductor.

It was a wooden framed building about 125 feet long by 88 feet wide. The man who designed the roof must have owned a lumber yard, for it was a complete network of beams, struts and rafters charred and blackened by the recent fire. The shop sides were covered with rusty sheet-iron all tattered and torn and perforated with holes. No skylight in the roof; all was gloom up there. Along the ridge was a ventilator, through which the sleet and snow had a free passage down to the moulds below. A few side windows about three feet from the floor were supposed to give light. On one side of the shop were two massive wooden jib cranes, with 1¼ hoisting chain, and geared with such mechanical ingenuity that it took thirteen men on the handles and wheels to lift fifteen tons, and eight men on a chain at the end of the jib to pull the crane around. The shells of the two cupolas were 48 and 33 diameter respectively; the linings of both were worn out, and when the larger one was in blast red patches could be perceived in the shell near the tuyers, which were oblong in shape, 7x3, and placed horizontally, fierce gusts of flame kept bursting out of the top of the charging hole, scorching the charger and shrivelling the remnant of roof above, for the door frame had been burnt off and never renewed. The amount of coke put into that cupola to get out metal thin enough to run into molds, was somewhere about three hundredweight to the ton of iron. The blower was of the Sturtevant type from which the blast was sent through an old tin pipe, open to the atmosphere at nearly every joint. The leather belts were constantly slipping off the pulleys and the worn out old engine as often running away—in the middle of a heat, for the blower was driven by pulleys on both sides—actually varying in diameter, so that while one side was driving the other was slipping. Besides, I discovered that the engine shaft

and pulley shafting were not parallel. The reason was this: On the fly-wheel shaft was keyed a gear, which meshed into a pinion on the barrel shaft of the metal drop. This metal breaking apparatus was a three-legged affair, about 30 feet high, and when the ball was near the top its career was stopped by a pawl and rachet, the shock from which shook the rickety old rattle-trap of an engine to its very foundation every time the ball was hoisted. No wonder the shafting was out of line, the belts constantly climbing and coming off the pulleys, and as a consequence the metal in the cupola dulled and deadened. I am not exaggerating when I assert that the proportion of bad castings daily thrown on the scrap heap or remelted in the cupola was at the very least 50 per cent. What else could be expected, for to crown all, it is a fact, that the Foundry at this time, was being run by the "boss laborer" at the magnificent salary of $2.25 per day. Good moulders shunned the place as they would a pestilence, and it was under the bann of the "iron-moulders' union." The largest ladle I could find was three-ton capacity. When heavy castings had to be poured they borrowed from neighboring foundries. The last large ladle borrowed was returned with a hole burnt in the shell near the lip, and it had to be patched on the outside. But perhaps the most interesting object in this museum of curiosities were the core ovens. Of all the instances of gross ignorance in Foundry construction that ever came under my notice the larger core oven was the most glaring, and one could safely back it to break the record.

I asked the "boss laborer" how much coke it took in twenty-four hours to heat that oven, and he reported 4,400 pounds. Doubtless the man was in error as to the precise amount, but manifestly, there was great waste of fuel; for one could stand halfway in the oven when a red-hot, heaped-up fire was burning without any discomfort whatever. When cores were left in all night they would next morning be burnt on one side and wet on the other. It could not be otherwise, for there was no current, or circulation, of air through the oven, as the chimney was built *right next the fire-place, with a hole in it* just above the fire through which the heated air went direct into the atmosphere.. It was bad enough having poorly melted iron, inferior facing and slow cranes, but when added to this were half-baked cores, the high percentage of defective castings and consequent failure to make ends meet may readily be conceived.

It appears that when this plant was contemplated, the wealthy men behind the project took in with them as a partner a railway conductor, to run the financial end of the business and as superintendent a man who had acquired some reputation as a machinist. The wonderful Foundry I have briefly, but very inadequately described, was mainly the product of the joint intellect of these gentlemen, who doubtless thought, like many others, that anything is good enough for a Foundry. But better experience has taught one, if not both, that in the construction and management of a modern Foundry—suited to these days of keen competition, something else is needed besides the knowledge of how to us a hammer and chisel, calculate change gears, run a boring mill, lathe and drill press, or shout "all aboard." Herbert Spencer's doctrine of "the survival of the fittest" is as true in the industrial as it is in the organic world.

(TO BE CONTINUED.)

The Falcon Bronze Co., a recently incorporated concern at Youngtown, Ohio, with a paid-up capital of $10,000, are erecting a very large and complete plant in that city for the manufacture of high-grade brass and bronze castings. They intend to give special attention to work required for furnaces, rolling mills, etc.

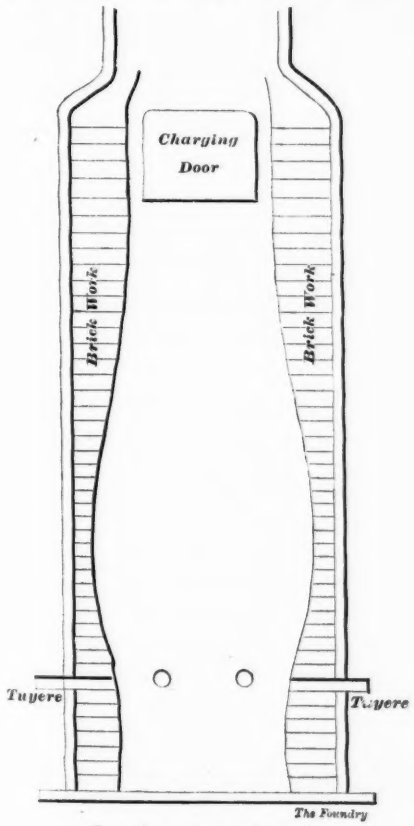
Are Our Cupolas Built Right?

JOHN PETTIGREW.

FROM all my experience and observations through a good many years the theory that cupolas should be built on straight lines seems to be the accepted principle the world over.

I don't remember ever seeing a newly-lined or newly-built cupola constructed in any other way than a straight, circular, or oval, tube from hearth to chimney. In looking over the advertisements, or catalogues, of *those who make a specialty of quick melting* cupolas the straight wall is shown in their illustrations.

Has it been proven that this is the best plan on which to construct this style of furnace, or is it because it is the most convenient in which to build it, or because, like the bees, we keep following the ways of our ancestors, and do not take time to think that the internal shape of a cupola may be constructed so as to give better results in melting. It has been our experience with a cupola newly lined, with the walls straight and smooth, that the melting would be much slower than it was before the old lining was torn out; the cupola would clog up much quicker, making it necessary sometimes to "drop the bottom," while a good deal of iron was yet unmelted. Next day we would find that the scaffolding over the tuyeres was very thick and heavy, so dense no blast could get



Cupola as it ought to be.

through it, the only open space being a small hole in the center and sometimes not even that.

As the brick turned out with each heat, it made the lining gradually the form of a barrel, being greater in diameter at the melting place, taking a form nearly like the rough sketch. The practice would gradually get better until a certain shape was reached, when we would have little or no trouble with hanging or scaffolding, taking out 40 tons and over a day and have a reasonably clean drop this has reference to a 48-inch cupola).

The question has often occurred to me, does the larger area made by the burning out of the brick make the working of the cupola better, or are there other causes then this one alone. We use no more fuel per charge, yet the iron melts much quicker and hotter, and th scaffolding does not bother us.

I think there are other causes which contribute to this result. The shape of the cupola makes the descent of the material charged much easier, greatly lessening the friction caused by the straight walls of the furnace; for in a straight furnace with heavy charges of iron the tendency frequently is for the charge to "hang," caused by the jaming together of the pigs and scrap, thereby letting the fuel burn away below, leaving a space where iron and fuel is not in contact, causing a very marked decrease in the heat or liquidity of the iron when tapped out and often resulting in a "bunged heat."

Again, the iron as it melts naturally would fall straight down if it met with no impediment, but the fuel through which it has to seek its way, diverts it from one side of a lump of coke in a slanting direction and with the action of the blast towards the center the streams trickle towards the sides, where the air is much colder, chilling a portion of the iron, causing the scaffolding and consequently the bad working of the cupola. When an inverted cone is formed by the burning out of the brick the materials of the charge settle uniformally there is no hanging, the pig and scrap resting always solidly on the fuel, melting as it gets to the proper zone of fusion, so that if the charge is properly mixed when thrown in, the quality of the product calculated on can almost to a certainty be obtained.

Another advantage obtained from this form is the difference in the direction of the heat rays thrown from the walls, the form being parabolic, the rays from the intensely heated brick is thrown on the charges, especially as the cupola is getting empty, in-

creasing the heat of the iron on the last charges as it is going down to the melting place.

When we look at the lines of a blast furnace we see the principal calculated on and carried out from the starting of the building, and it has often occurred to me would it not be a vast improvement on the cupola to carry the same principle out from the start instead of keeping to the old form. I think there is a wide field to work in this line.

Hints Helpful to the Molder who Does Not "Know How."

E. H. PUTNAM.

MOLDS that are good will not yield to the pressure of iron, and the force of its resistance to the circulation of gases within the sand of which it is composed will never equal the pressure of the gases within the mold cavity while being filled with iron. In a properly constructed mold the inflowing iron forces the heated and rapidly expanding air out through the porous sand without, of course, in the least disturbing the sand on the surface of the mold cavity.

But if you leave a "riser" uncovered you deprive the mold cavity of the pressure necessary to resist the force of the expanding gases within the sand, and they rush into the mold cavity, sometimes carrying a portion of sand from the face of the mold with them—and there you have a scab. Again, if the "risers" be properly stopped, and you do not keep the pouring gate sufficiently full of iron, the gas may force its way, either interruptedly or continuously, out over the surface of the inflowing iron, carrying with it a portion of the burnt sand from the face of the mold, leaving on the casting a rough, irregular prominence; and you say, "That sand cuts." Why should it not?

The fact is, there are certain natural laws universally and invariably operative in iron founding, and our duty is to know what they are, and to respect them, for they will never yield an inch to us!

SCABS.

A scab is caused by expanding gases within the sand bursting into the mold cavity and carrying sand with it; and hard ramming next the pattern is almost certain to produce it. Never let the rammer approach within two inches of the pattern. One such blow of the rammer may cause the loss of a piece that you take half a day to make. Therefore, if through carelessness or accident you make such a stroke, stop! Take your trowel and remove all the sand from the pattern at that place, then replace it with fresh facing sand, and proceed—more carefully. Do not trust to luck; it will ruin any man.

There are certain principles underlying all industrial activities bearing upon all classes, the employer as well as the workman, that, if constantly observed, will certainly lead to success. And one of these is, reduce the chances of failure to the minimum by alert intelligence. The word "luck" has no place in the vocabulary of the successful man. A senseless dependence on "luck" costs the molders of the United States an aggregate of millions of dollars every year.

It is mind that conquers matter, and the degree of the molder's success measures the intelligence that he applies to his work.

SHOT IRON.

Probably more difficulty arises from badly tempered sand than from any other one fault in molding. Iron will not lie quietly on wet sand. It will sputter and project small globules of iron to remote parts of the mold while filling, and they will appear as "shot" iron imbedded in the face of the casting. Some writers on founding have explained this phenomenon of "shot" iron in a casting on the hypothesis that the shot iron thrown into the cupola has passed through it, and through all the processes of casting without having been melted.

In pouring very "cold" iron a detached globule may by isolation become solidified before the main body of the inflowing iron rises to its place of lodgment, and floating up to a greater or less height, remain a shot of iron within the casting.

TEMPERING SAND.

The question of "temper" of molding sand should not be debated, but should be decided by experiment, each man for himself.

Temper three separate quantities of sand, of various degrees of moisture, and make a mold in each. Examine closely the castings produced. A few experiments like this will inform you as to the temper required for

your work. If the sand be sufficiently dry, it will produce a smooth, elegant surface on the casting; but if a little too wet, the casting will be rough and unsightly. This is due to the fact that wet sand cannot be so compactly rammed as dry sand, and will leave on the face of the mold an infinite number of scarcely perceptible depressions, every one of which the molten metal will find and occupy.

VENTING.

Sometimes the vent-wire alone will not provide sufficient means of escape for the gas; as, for instance, in a deep angle, or a green sand core. Place the facing sand on the pattern, and on this stand on end one or more (a dozen, if needed) smooth, round sticks or pins of wood, one inch in diameter and long enough to project above the flask. Ram these up in the nowel, and before striking it off, draw them out and fill the holes with free or sharp sand. The gas will pass away through these columns of coarse sand with perfect freedom, and there is not enough of it to injure your sand by its presence.

Do not use a tapered vent-wire. It compresses the sand into a hard wall all around the hole, difficult for the gas to penetrate. Besides, the extreme difficulty of forcing it into the sand will induce you to scant the venting where it ought to be most thorough. If the wire has a little greater diameter at the end than elsewhere, it will run through the sand with ease, leaving a hole into which the gas will find ready access.

If iron finds its way into the vent hole, it had better not have been made; for gas can escape through hard rammed sand a good deal more easily than through solid iron.

Do not run a vent-wire through the cope from the upper edge of the rim of a pulley, or from any other such elevated part, with the idea that you are venting it. Do all venting, except for cores, before the cope is lifted; and in the case of a pulley vent down nearly to the parting, an inch and a half each side of the rim, and never ram hard enough directly above the rim to make any venting there necessary.

VENT FROM CORES.

Do not trust the patternmaker, coremaker, foreman, or anybody but yourself, to keep a core from capping with iron. Never close a mold until you are absolutely certain the iron can not get into the core vent. All core vents should, if possible, be conducted through the sand of the cope, to avoid burning the flask at the joint.

If a casting be streaked on the under side, either the sand is too wet or you are ramming too hard. If lighter ramming of properly tempered sand do not cure it, then place a half-inch thickness of very dry sand over the surface of the pattern, finishing with sand of ordinary temper. This dry sand will not be disturbed by the flow of iron, and, containing but little moisture, little gas will be generated from it, and your trouble will be conquered.

GATING.

Iron should never flow downward in a mold, but should first strike the mold at the lowest point and rise upward to the highest. Thus the iron will, as it were, unfold itself along the bottom and sides of the mold without the slightest friction upon the sand. On the other hand, if the iron enter at the highest point it will spread out into a wide, thin sheet and slide along the surface, and, as the sand becomes dry, it will, to some extent, be carried along with the current, making on the casting a scarred bottom and a dirty top. It must be borne in mind also that this thin stream of iron offers scarcely any resistance to the expansion of gas in the sand beneath it, and so permits disintegration of the mold surface.

A large basin at the bottom of the gate pin will greatly facilitate skimming; for, iron being so much heavier than dirt and slag, presses it to the top with great force, and if there be room for it to recede from the downward stream it will remain in the basin; and to facilitate this, the sprew hole should be enlarged at the joint of the mold. The branch gate from the basin to the mold cavity should be very narrow and very deep, thus presenting a very narrow passage for the iron at the center of the basin, where no slag or dirt can possibly collect.

A branch gate three-eighths inch wide at top, tapering to nothing at bottom, two inches deep, running from a basin as described, will insure a clean casting if kept full in pouring.

The Berlin Iron Bridge Co., of East Berlin, Conn., have just completed for the United States Projectile Co., at South Brooklyn, N. Y., the steel framework for a new Annealing Room. The building is 100 feet wide and 150 feet long, and is designed to be a fire-proof structure.

New Methods.

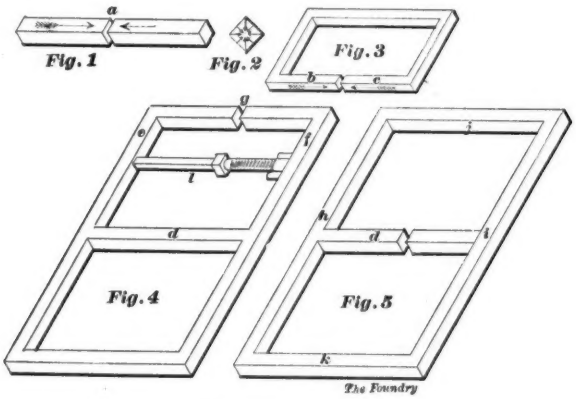
H. HANSEN.

ELECTRIC welding has been used to remedy blowholes in defective castings, by first drilling or chipping out the defects and then heating the casting around the blowhole in a gas or oil flame blast, scraps of steel are then introduced, and the electric arc is applied to melt them. The result is said to be a perfect joint without seam or flaw of any kind."—Electrical Review.

The above paragraph from a leading journal in its class upon a subject directly concerning foundry men in general, may be looked upon by those who are but slightly acquainted with the principles involved in burning, as opening a new field in this line, where it shall be possible to repair an old casting at less cost than would be required to install a new one. If electricity can successfully be employed for melting iron to fill a blowhole, and also melt the casting itself immediately surrounding it, for both must be at the melting point simultaneously, in order to join together perfectly, there is no reason why it could not be applied to burn something else besides blowholes.

One great advantage that electricity would have over prevailing methods, is the ease with which it can be applied in places where the present style is out of the question. To burn a casting nowadays it must necessarily be removed to the foundry, this involves quite an expense, according to the character of the job, and carries with it other objectionable features. Profanity seems to be an article now consumed in large quantities in order to effect a union, at least one would think so from the generosity with which it is applied, but with electricity this obnoxious ingredient could possibly be dispensed with.

It is but seldom that burning is resorted to, for the sake of saving the cost of molding and melting the metal, the cost of making a pattern often causes this course to be pursued, or a pattern may be on hand, but the casting will require considerable valuable machine work, which it is desired to avoid, so while it would be economy to overcome a difficulty in this way in one case, in another it could be exactly the opposite.



Electric Welding.

It is not intended to be within the province of this article to deal with or illustrate methods for accomplishing burning, but less anyone shall think that all the objections thereto would disappear with the introduction of this new agent (electricity), or look towards it as an ideal solution of all the ills that burning is heir to, I wish to state that the greatest obstacle in the way of burning anything successfully, viz., unequal contraction, is still with us, and always will remain, no matter by what methods, electrical or otherwise, we accomplish burning.

The question which therefore presents itself for consideration when it is desired to remedy a defect in this way, is not "can it be done" but "will the design of the casting per-

mit it." This is the puzzle which can often be solved only by a practical demonstration. While it is possible to construct some patterns upon such lines, as will have but a small fraction if any of unequal contraction, although this is seldom attempted, the design prohibiting a casting to be burned will always under any and all conditions have this principal obstacle to contend against. As this statement may appear exaggerated I will furnish a few illustrations in its support. Let Fig. 1 represent a square bar to be burned together at the place, A, both ends being free to move and adjustable to such positions as may be called for. It may appear as if there could be no unequal contraction in this case, but iron contracts in a vertical as well as a horizontal direction, so that while there is nothing to interfere with the ends of this bar from moving toward each other, as indicated by arrows a glance at the cross section of this bar Fig. 2 will show that the tendency of contraction in one direction lays towards the center, as the part burned is at a higher temperature than the original part of the casting, it follows that contraction will not be even.

In cases like the above poor results are rare from this source, but taking Fig. 3 for our next subject, it will be apparent that more resistance to contraction is here offered than in Fig. 1, but the casting is of such a design that unless made originally of very hard iron, no trouble should be had in doing a satisfactory job, as ordinary cast iron possesses sufficient elasticity to let the parts b, c, be brought slightly together in the direction shown. Increasing the difficulties which beset burning gradually we come to Fig. 4, where the chances for success are further removed than in the previous cases. The rib, D, acting as a brace, prevents the parts E and F from being drawn together, if now the contraction of the burned part, G, exceeds the elastic limit of the metal it follows that the casting will break. The more obstacles that are thus put in the way of contraction and these increase constantly with the more complicated castings where light and heavy parts are promiscuously thrown together, resulting in a strain when originally cast, the greater are the chances against sufficient scope for contraction being allowed without causing a defect to appear in some other part. The reason such defects as cracks hardly ever take place in a burnt portion is because other parts furnish a weaker spot. Burning castings in different portions will produce a strain in different directions. Thus in Fig. 5 burning the rib, D, will result in the parts H, I, being drawn together, the parts J, K, acting as obstacles in this case.

Arms in pulleys or the rims thereof often crack, but the attempt is but seldom made to burn them, and less often attended with success. The reason is identical with that shown in Figs. 4 and 5.

It is often possible to greatly counteract the effects of unequal contraction in such castings as Figs. 4 and 5 by using the arrangement at, 1 Fig. 4, to force the parts to be burned a small distance apart when contraction begins the screw must be loosened, less strain will thus be produced as it is partly provided for in advance. The softest kind of iron that can be obtained is the most desirable for burning for the natural tendency of the iron in the repaired place is to become of a harder quality than if it was poured into molds in the ordinary way.

For absolute safety to the casting and the purpose for which it is to be used nothing can compare in removing such a defect as a blowhole or a sandhole, as generally understood, with the ancient way of removing it by drilling a hole, cutting a thread therein and inserting a plug.

So let no one imagine that the advancing avalanche of electricity will interfere with us very much in this line, but for whatever improvements in methods it can give us that will save us from undesirable exertions let us be thankful.

Aluminum, Silicon and Phosphorus in the Brass Foundry for Special Work.

F. J. DAVIS.

THE ADVANCE in the use of high grade mixtures of brass and bronze during the past few years has been rapid, and where formerly almost anything in the shape of brass or bronze was good enough for a casting, a special mixture is now required for a great deal of the work that comes to the brass foundry.

Prominent among the metals used at the

present time for making special alloys and improving the ordinary mixtures of brass and bronze, are Aluminum and Silicon. Phosphorus is also used extensively. The rapid decline in the price of aluminum has been followed by a large increase in the consumption of that metal for making aluminum bronzes, and for adding in small quantities to other alloys. Probably more of the 10 per cent aluminum bronze (90 parts copper, 10 parts aluminum), is used in castings than any of the other grades. The 10 per cent bronze is used largely for work where a metal of great strength and toughness is required, and in castings where the metal comes in contact with acids. Five per cent aluminum bronze often called "gold bronze," is largely used for drawing into wire, rolling into sheet and for ornamental work. It's color resembles that of gold more closely than any of the other grades. Drawing and rolling hardens and stiffens the bronze. The 5 per cent bronze also makes a better bearing metal than a tin bronze containing as much as 10 per cent of tin. The addition of from one-fourth to 1 per cent of aluminum to brass or bronze scrap cleans the metal, makes it more fluid and stiffens and hardens it considerably. In making large and heavy castings of aluminum bronze the metal should enter the mold without being exposed to the air in order to avoid the thin film of oxide, which forms on the molten bronze when exposed to the air, and which shows up in the casting as dross if it is allowed to enter the mold. To accomplish this a cheap secondary pot can be made from an old crucible by cutting a one inch or one and one-half-inch round hole in bottom of same, using a tapered iron plug to close hole. This secondary pot, after being heated, should be set on mold over the gate and the melted bronze poured into it. The metal should be allowed to stand for a minute to permit the dross to come to the top, before pulling the plug. Although this mode of casting is somewhat troublesome, it is the only way in which a perfectly clean casting can be made. On account of the great shrinkage of the bronze, risers or feeders should be placed on heavy parts of the casting where shrinkage is liable to occur. Aluminum bronze for rolling or drawing should be cast in closed chill molds using secondary pot as described above. Probably one-half of all the aluminum produced is used in treating iron and steel, the addition of a very small amount prevents blowholes and makes the metal more fluid. In casting, pure copper aluminum is not nearly so effective in removing blowholes as Metallic Salicon. The addition of only one-tenth of 1 per cent of silicon to melted copper before casting, will make the copper more fluid, remove the oxide of copper, make the casting clean, solid and entirely free from blowholes. By the use of silicon in this manner difficult and complicated castings can be made from pure copper. None of the Silicon remains in the copper, so that the electrical conductivity of the copper is not impaired, and this is very important where the castings are to be used in electrical work. A great many tuyeres for blast furnaces are being made from pure copper treated in this manner with Silicon, and they are much superior to tuyeres made from bronze or other metals. Wire which has been drawn from copper previously treated with Silicon is much more ductile and will stand three or four times as many twists in a given length as copper wire which has not been so treated.

Below is a formula for making a superior bearing metal for railroad car brasses, and other heavy work, in which a small amount of Silicon is used as a flux:

Copper, 80 pounds.
Tin, 12 pounds.
Lead, 8 pounds.
Silicon Copper, 2½ pounds.

Phosphorus is also used for fluxing copper and bronzes and accomplishes about the same results. It is more effective than aluminum for this purpose but not so effective as Silicon. As Phosphorus will ignite when exposed to the air, it must be kept under water and handled very carefully. A burn caused by Phosphorus stays right by you as the writer can testify from experience.

Silicon has none of the disadvantages of Phosphorus and is much more pleasant to handle.

Bremen, Ind., should be proud of the Holland Radiator Co. It is one of the chief industries of the place, and has been running full-handed all season. John McKinney, formerly with the Dodge Manufacturing Co., if foreman.

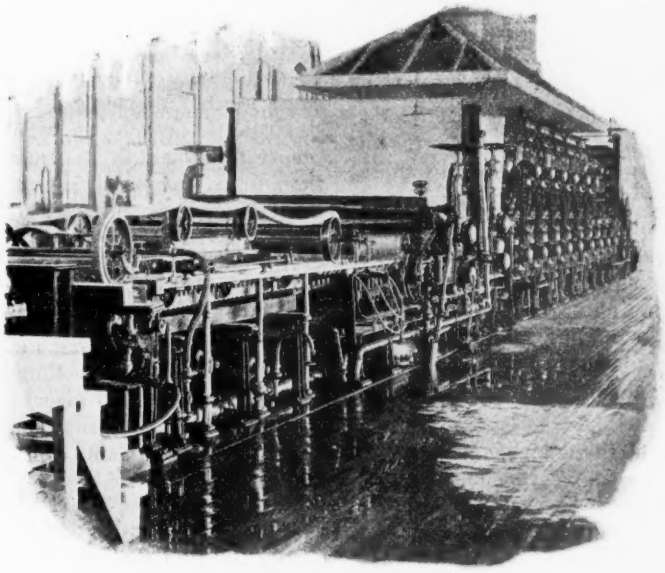
The Bagley & Sewall Co.

CHAS. THOMAS.

REMOTE from the strife, turmoil and hurly burley of the larger cities and situated on both sides of the Black River, in the northern part of New York State, and near where it empties into Lake Ontario, is situated the City of Watertown. Among the many flourishing establishments that derive their power from the aforementioned river, and which line its banks, is the well-known Bagley & Sewall Co., who have become famous as manufacturers of paper mill machinery. But this is not all, the progressive spirit that must have existed to build up a business of gigantic proportions in that locality, has given recent evidences of activity inasmuch as this enterprising firm have lately erected one of the largest and most modern foundries in the entire country, into which they are now moving from the building they have occupied for between 30 and 40 years.

It is 75x200 feet, and erected by the Berlin Iron Bridge Co., under the supervision of Mr. F. H. Link. It is built on the solid rock, hence much excavating for foundations was not necessary, and the main pit used for pouring large pieces of work is not likely to be over damp. This pit is 16 feet wide, 15 feet deep and 35 feet long.

There are four core ovens, two cupolas and an electric traveling crane, built by the Brown Hoisting and Conveying Co., of Cleveland, Ohio. The heat is furnished in winter by the Sturtevant hot air system, and the shop, by the same apparatus, can be cooled and ventilated in warm weather. Sturtevant blowers are also in use for furnishing blast to the cupolas. Our illustration is made from a photo of one of their specialties, the Fourdenier Paper Machine, which consists of a series of large cast iron rolls, through which the paper is passed, the rolls being heated by steam to a certain heat all the time.



A Paper Making Machine.

As these machines average 150 tons each and are highly polished and finished throughout, it can be readily seen that they contain considerable cast iron work of a high grade.

The rolls, 17 or 18 in number, are 48 inches in diameter, and run all the way from 6 feet 8 inches in length to 10 feet 3 inches. They are made in dry sand, poured on end and have to turn up without a speck or flaw of any kind and weigh as high as 6,000 pounds each.

They have several of these machines under way at this time, two of them going to Japan.

Apprenticeship the Molder's Trade.

W. FERGUSON.

IT IS a noticeable fact that in most foundries in this country there is a general complaint of inferior mechanics amongst molders; that good mechanics in this line are becoming scarcer each year. This is common comment that is heard everywhere.

Such being the case, there must be truth in the statement, and at the same time a cause for such conditions. To me it can only be accounted for through lack of a proper apprenticeship system, and the want of interest by proprietors in looking after this part of their business; and the larger the concern, the less care or attention is given to this factor in their welfare. Instead of trying to school young men to grow into positions of trust, it is the common practice for them to engage men from outside to fill positions that legitimately belong to those who have grown up with the concern, and are the rightful heirs to such positions, and where this occurs, it, to my mind, is an evidence and an acknowledgement on the proprietor's part that he or his managers are incompetent in the work of making mechanics, as the material from which to make them is about an equal puality in all locations.

The writer considers the molder's trade the most skillful in the engineering business, as it requires the exercise of constant care and good judgment to meet the many demands placed upon it, the many different elements and conditions entering into each individual job, to bring it ot a successful end, requires the full knowledge not only of the requirements of the castings (and this is rarely furnished), but of all the material used in its construction, which means a knowledge of the chemical properties of the material used in the construction of the mold as well as the iron and fuel used in its melting. This coupled with the mechanical operation of constructing and casting same successfully, will help to sustain my first statement, and this being a fact, is it not really wonderful that such good results are accomplished in the foundry by men who are not schooled any in this line, and to contemplate what could be accomplished if molders were properly educated in their business. As a rule well informed boys do not take to the foundry business. I presume because it is a dirty trade and has lots of hard work attached to it, but the betterment of the molder's art demands to-day the attention of men of higher education than in the past. Therefore the writer would advise a sort of civil service requirement of all applicants for apprenticeship, so as to create some standard of efficiency before commencing the business.

The present system (or lack of system) is certainly to the detriment of all concerned. After an experience of thirty years in the different capacities in the foundry, I am forced to believe that the only true way to govern apprentices is by indenture and by indenture, I mean an agreement that will be as binding on the part of the proprietor as on the boy or young man, that both parties can be held to an accounting for the proper fulfillment of the same. Four years' time, in my judgment, is long enough (if the proper course is pursued) to make a good molder, and I would divide this up into one year in core room, to become thoroughly competent in the making and use of cores; second year to be taken up with molding of small work and assisting in a general way at care of cupola and looking after patterns, in fact so used as to dispel the belief that he has any general routine to follow, but schooled to be biddable and do whatever is required of him. After one year of such training it will be found necessary to advance him to a higher class of work, shifting as occasion may require, from light to the heavier work, and occasionally a chance at dry sand and loam, if such class of work is done in the shop. At the end of the third year he should be trusted with the most difficult work in the shop, and when he fails to make good work, do not scold or condemn him, but advise with him from your own experience as to the cause leading to such results, and thus impress upon him the necessity of studying cause and effect at all times. This same course should be followed from the start. With four years of such training it will be found we have a much better mechanic than the average one, who is compelled to pick up his trade in the best haphazard way possible, without any care for his future. And to make a success of the

made occasionally that will weigh more than foregoing each proprietor must take an individual interest, and look upon his apprentices as one of the greatest factors in his future prosperity. On the other hand, if things continue on the same lines as for the past twenty years, there certainly will be a greater scarcity of good molders, and manufacturers will have to continue sustaining the great percentage of loss common to all foundries, caused by incompetent workmen.

Foundry Work at Purdue University.

M. J. GOLDEN, M. E.

Purdue University has a foundry in its engineering laboratory that is 40 feet wide by 70 feet long. The walls are of brick and support a trussed roof, leaving the floor free from obstruction by columns or posts. The roof trusses are made strong enough to be used for the attachment of apparatus for lifting the larger molds and carrying the heavier ladels. The room is lighted from a turret in the roof as well as from the side windows.

The floor consists of a sub-bed of gravel over which is laid six inches of molding sand, that is rolled and rammed hard. A brick walk, six feet wide, is made around three sides and on this the molding benches are placed. A core oven of brick, five feet by eight feet, is built in one corner.

The equipment and its location are as follows: A Colliau cupola furnace, of twenty-five inches inside diameter, is in the center of one end of the room. Against the walls of the other three sides, thirty molding benches are placed, each having a set of molder's tools. A sheet iron core oven, of the Taunton type, three feet by four by five, is in position near the larger brick one already mentioned. A core bench with bins of core sand is situated in one corner of the room, away from the other benches. Here are kept the flour, rosin, oils, and other things used in making cores. There are about 150 flasks of various sizes, and the floor has a supply of both coarse and fine molding sands.

Bins for the storage of the fuel and pig iron are made outside the building, and there is also a shed for the storage of the flasks not in use.

A small rotary engine of four horse power is used to drive the cupola fan. It is placed back of the cupola, near the roof and can be controlled from the charging platform.

There are a dozen ladies, varying in size from one capable of holding 1,200 pounds to the ordinary hand ladle for one person to carry.

The foundry is heated and ventilated, in common with the other shops and laboratories, the Sturtevant system being used. The core ovens are heated by gas.

Instruction in foundry work is given partly in the foundry and partly in the lecture room. That given in the foundry commences with the tempering of sand and the making of light molds from a variety of small patterns, the students giving special attention to such features as ramming, venting, facing, making gates and placing cores.

The cupola is put in operation when the instructor is satisfied with the results gotten in molding. For the purpose of instruction in the management of the cupola the students are divided into sections of about ten, and charge of the cupola is given to each section in turn for a certain period. They see to all the details, daub the inside, make the bed, charge, line the ladles, and pour the molds; and after each run submit a report of their work on a suitably ruled blank provided for the purpose.

Of coursee, considerations of physical strength and other qualities determine each student's place in a section.

While one set of students is engaged in cupola work, others are making molds. In this work, as each mold is completed it is placed in position on the floor and clamped ready for pouring by the student who made it, and who is required also to submit a statement on a prepared slip as to its character and the weight of the metal required to run it. The molders take turns making and baking cores.

Patterns requiring more skill in their handling, either because of their greater size or more complex character, are given to the students as they become more skillful in the work. They are given three part molds in two part flasks, molds made partly of cores, and such other work as requires on their part an increasing knowledge and skill.

The castings made do not, usually, weigh more than 300 pounds, though there are some

this. At first, about 40 per cent of the castings are good, but this soon increases to about 80 or more as the students become more accustomed to the work. After the castings have been cleaned and pickled they are carried to the machine shop where they are submitted to the test of actual use.

The lecture room instruction that accompanies this work in the shops consists of a series of illustrated lectures in which are discussed matters of special interest in connection with the foundry work, such as the occurrence of ores, their extraction and reduction, the various features of cupola furnaces, the sands, clays, loams and other materials used in the foundry, the methods in use for making larger molds than the shop practice in the university foundry admits of, and such other matters as are pertinent to foundry practices.

In connection with this lecture room work the students are required to submit note books in which all these matters are described and illustrated.

The subject of the construction and care of patterns is discussed in connection with work in pattern making done by the students at another period of the course.

It may be of interest to sketch the general scheme of the engineering shops and laboratories of the university of which the foundry work is a portion.

This scheme requires that each student have a working knowledge of the various steps necessary in the making of a machine or structure. After he has this he goes to the testing laboratory where he determines by actual trial how efficiently and economically engines and other motors and machines are doing their work.

In pursuance of this scheme he takes the drawings of the designer and from them makes drawings of details for use in the work shop. From these detail drawings he constructs the patterns, makes the castings, and assists in finishing and fitting the castings in the machine shop.

During two years the instruction and practice are in the methods of the work shop, and then the work of the testing and designing rooms is taken up.

For the efficiency of the shops and laboratories of Purdue University credit is mainly due to President J. H. Smart, who early saw the benefits to be derived from them and who has given to them his earnest and continued support.

Prof. W. F. M. Goss, dean of the schools of engineering, has had charge of the engineering work of the university, and to him, next to President Smart, is due the standing of the engineering schools.

The lecture room work that accompanies the instruction in the shops is in charge of Prof. Golden, who also has immediate charge of the shops.

Following is the list of the instructors in the shops, with their positions: W. P. Turner, instructor in machine work; J. D. Hoffman, M. E., instructor in wood work; C. Peterson, B. C. E., instructor in mechanical drawing; J. E. Kolb B. M. E., instructor in forge work; P. W. Covert, B. M. E., instructor in foundry work; A. P. Jamison, B. M. E., instructor in wood work.

There are at present 203 students in the freshman and sophomore classes who are doing the work of the shops

CAST IRON NOTES.

Devoted to Inquiries from Practical Foundrymen on the subject of Melting and using Cast Iron. Address all Inquiries to W. J. KEEP, care of The Foundry.

HOW can I become familiar with the physical and chemical properties of cast iron, and what books can I consult? I have had this question asked many times during the past season, and I have in most cases thought best to answer by a personal letter, but I will answer an inquiry just received, in this column.

A person interested in foundry business would desire to thoroughly understand cast iron. Take the conditions as they now exist in your foundry. Find what brands of pig iron you use, and the proportion of each, how much scrap, what kind of coke and how much iron is melted with one pound of fuel. Figure up the cost of the iron as it leaves the cupola. The next thing is to become familiar with the influence of silicon in cast iron. "Iron," by Thomas Turner, one of Griffin's metallurgical series, contains two chapters on cast iron, which state the latest conclusions on the subject. I shall, however, be happy to send pamphlets explaining

the influence of silicon in cast iron, to any founder who will ask for them. The next step is to measure the shrinkage of a test bar made from the mixture of iron that tells you how much silicon there is in the test bar.

It is also interesting to test the strength of the test bar. When you have gone this far find if the castings that you are producing are in every way satisfactory. If they are exactly what you want, make a record of the shrinkage of the test bar as the standard shrinkage for your class of work, and remember that so long as you maintain this shrinkage you will keep the grade of your castings uniform. If the shrinkage increases, increase the silicon. If the shrinkage decreases, use more scrap. You must get this far before you can intelligently study the properties of cast iron. After this you will be full of questions. Why does silicon do all this, and how does silicon affect strength, and how can you get silicon into your mixture? If you have to work a little to answer these questions, you will understand the reasons better than if they were placed before you before you had asked the question. The question of strength is a very complicated one, but is very interesting, and you will enjoy finding the combination of irons which will produce the strongest castings, and still keep the shrinkage at the point that you have found to produce best results.

The next subject that you will be interested in is decreasing the cost of your castings and at the same time improve the quality. You can find what irons cost least in your market. Purchase a carload and add 100 pounds to each charge, instead of 100 pounds of the highest priced iron you are using, and watch the shrinkage of your test bar.

If the shrinkage increased, the 100 pounds that you added contained less silicon than that which you took out, and you must get the silicon back again. Next restore the old mixture and change with another iron. You will soon find a way to use cheap irons and keep the shrinkage as you want it.

The slight difference in the quality of the casting produced by a change of 100 pounds in a charge, will not be felt, because the measure of shrinkage is such a sensitive feeler that you detect a change that cannot be felt by the one who machines a casting.

The method of study that I have outlined is the method pursued in all modern Trade Schools.

Perform the work and search for an explanation of what appears mysterious. This is the laboratory method. You perform the experiment to fix in your memory the reason for what you see. This is the best way to study cast iron. Modern research has found answers to many of these questions, and it is not necessary or desirable for each person to repeat the investigation, but before you will know how to apply the information you must ask the question, and you cannot ask it until you have gone just so far in the study of the subject.

If the iron mixture is not right, a foundry can bankrupt a firm in a very short time, but if the mixture can be kept uniform so that each casting is perfect, founding is a fairly good business. There is no subject that is more interesting or profitable than the study of cast iron.

In melting pig iron in a cupola how much of its silicon is burned out? Silicon is not evenly diffused through either pig iron or castings, therefore it is not possible to obtain an analysis from drillings that will accurately give the silicon in either. The heat of the cupola, the rapidity of melting, the quality of the fuel and many other conditions exert such an influence upon the silicon that the loss of silicon will vary. The making of gray iron castings very fortunately does not require an exact percentage of silicon. The lower the silicon in pig iron the less the loss. Silvery irons containing 5 per cent silicon will impart the most of their silicon to the mixture. Silicon iron with silicon over 7 per cent costs more than that with lower silicon and much more of the silicon is lost, and worse than that, the silicon will not be evenly diffused in the casting. Pig iron varies in composition so greatly from day to day, that its exact composition cannot be determined. For this reason several irons should be used so that a chance variation in one will not greatly influence the castings.

Probably a quarter of 1 per cent of the estimated silicon in the mixture will be lost.

Each size of castings requires a different percentage of silicon to produce the best results. Stove plate is best with about 3 per cent. Heavy machine castings require from

1.50 to 2 per cent. The larger the casting the less silicon will be required to produce the closest grain and the greatest strength.

Iron with 3 per cent silicon will be more fluid and will remain fluid longer than with less silicon. Iron will be dirty if not melted hot. Increase the temperature of the cupola and the iron will be so fluid that the dirt willl rise to the surface of the ladle and it will be more fluid when the molder pours his work. A few oyster shells or a little limestone charged along with the iron will form a slag on the surface of the melted iron in the cupola, and this will act as a strainer to take out dirt. You will get better results by measuring the shrinkage of a test bar, and keeping that uniform by increasing or decreasing the iron that contains most silicon than by figuring percentages of silicon.

Cylinders for marine engines. If the metal is about one inch thick the percentage of silicon should be about 2 per cent. To harden the wearing surfaces add a little old car wheel scrap.

A small portion of cuttings from the edges of boiler plates charged in the cupola will increase strength and wearing quality.

Scabbing of Bathtubs. On the inside of cast iron bathtubs opposite the thickened portion where the legs are to be secured, the unequal shrinkage causes a thin layer of iron on the inside to separate and come off. This is caused by the casting being thicker at that part. To prevent this make that part of the tub of the same thickness as the rest of the bottom, and use the tin cleats made by Burdick & Son, of Albany, N. Y., to hold the feet. It might be worth a trial to ram into the sand a chill that would cover one-half of two-thirds of the thick portion and thus cool this portion of the casting as quickly as the thinner parts

To prevent Enamel Separating from Cast Iron Bathtubs. The surface of all castings is covered with graphite. This is caused by the exudation of graphite from the casting itself, and by particles of facing that are burned on with the sand. If any of this adheres after the casting is cleaned and scoured, the enamel is likely to peel off when the casting cools.

The most efficient method of cleaning bathtubs is by sand blast, which picks out all grains of sand and flakes of graphite. Another method is to use no facing, but to make the surface of the mold of riddled sand. Leaving off facing will allow the sand to burn into the casting but it will be much more free from graphite. Immerse the tub in a tank of dilute hydrofluoric acid, which will attack the silica in the sand and will leave the casting clean. This acid would not attack the iron at all, but the commercial acid contains a trace of sulphuric acid, which causes a slight action on the iron.

Either of these processes will leave the surface of the casting so clean that the enamel will not peel off.

In these days of interchangeable parts it becomes necessary to give every piece of a machine, stove or other cast article a distinguishing name or number. This can be most effectively done by the use of some of the pattern letters or figures now supplied so cheaply by those in the business of manufacturing them. Then again those concerns who have adopted systematic methods of keeping track of patterns have found it best to give every separate pattern a distinguishing mark which is also done best by affixing pattern letters that may be stopped off in the mold or left on as the case may be, these numbers corresponding with a kept record in which every pattern and its number and location is entered. The use of name plates is now so general that no one with any enterprise thinks of allowing a piece of work to leave without seeing that it carries with it an advertisement in the shape of a tasteful name plate, etc., unless they feel ashamed to have their name connected with it.

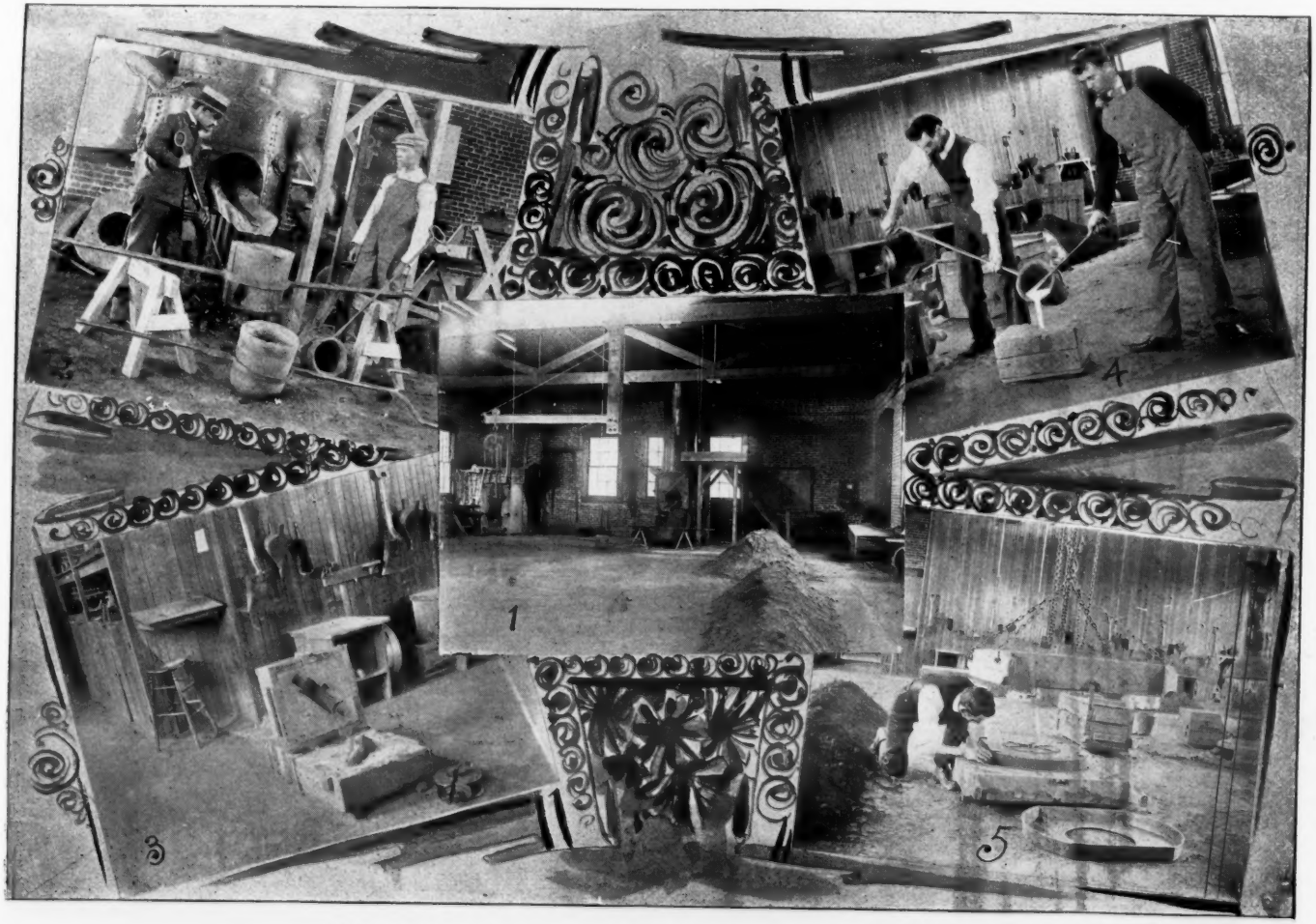
H. W. Knight & Son, Lock Box No. 1156, Seneca Falls, N. Y., are the leading manufacturers of pattern letters in this country, and their advertisement elsewhere shows a few of the designs they keep constantly on hand.

Salem, Oregon.

We are regular subscribers to THE FOUNDRY, and are well pleased with it.

NORTHWESTERN STOVE FOUNDRY,
Per R. B. Fleming, Vice-President.

The Hamilton Foundry and Machine Co., of Hamilton, Ohio., are sending their customers and friends a sample of the fine work done at their establishment in the shape of a very ornate card receiver.



THE FOUNDRY AT PURDUE UNIVERSITY, LAFAYETTE, IND.

1—Interior, showing Cupola and Core Oven. 2—Waiting for Iron. 4—Pouring Off. 3 and 5—Samples of Work done by Students.

SOME VIEWS AT THE ATLANTA EXPOSITION (See opposite Page.)

Iron Exhibits at the Fair.

JUDGED purely from a foundryman's standpoint the Atlanta exposition is not unlike many other exhibitions, although there is more of a display of pig iron and iron products in and near the Alabama building than is often seen in an equal area.

The illustrations on opposite page give a few of the notable objects shown there. No. 1 in the center shows a corner in the exhibit of the Southern Plow Co. in the Georgia building, the large pyramid of kettles in the foreground being exceptionally fine castings.

Fig. 2 is a corner of the very large exhibit of the Tennessee Coal, Iron & R. R. Co., which consists of ore, coke, pig iron, etc.

Fig. 3 is a large water pipe exhibit by the Howard-Harrison Iron Co., of Bessemer, Ala., while Figs. 4 and 5, representing two of the exhibits of the Pioneer Mining and Manufacturing Co., are thus described by J. H. Adams, superintendent of mines, etc.:

The ordinary exhibitor usually goes to much expense for the purpose of advertising and extending his business, in this case, however, nothing but a desire to help show up Alabama's mineral wealth prompted this company to make an exhibit, inasumch as the products of its furnaces are always sold ahead.

It was a graceful compliment to the south for that company to show in the sentiment displayed in its exhibit, Fig. 5, its faith in the future of the Birmingham district. The sentiment reads "Jefferson County, the keystone of Alabama's Iron and Mineral Arch, destined to span the world." The exhibit, built in the shape of an arch, consists of pig iron, iron ore, coke, coal, limestone, and various building stones found on or mined and quarried on the properties of the Pioneer Mining and Manufacturing Co. in the counties of Jefferson, Tuscaloosa, Shelby, Talladega, Bibb, St. Clair and Blount, all in Alabama, and more particularly the Birmingham district.

The members of the Pioneer Company, it should be remembered, are all heartily interested in furnaces, etc., in Pennsylvania.

The iron arch of the exhibit rests on and is surrounded by blocks of iron ore and fluxing stone, a piece of the latter stone from the company's limestone quarries at Dale, Ala., being the round globe seen in our illustration representing the world. This stone is a remarkably pure flux, showing 97 per cent carbonate of lime.

The square block seen on the right of the illustration (next to the pig iron) is from the Spaulding mine of the company, at which place they load the hard red hematite for use in the furnaces at Thomas, Ala. The flat surface of this piece of ore, as seen in the picture, shows the natural clearage planes often met with in the mines. Spaulding mine is opened on the Red Mountain big vein of ore, which has a thickness of twenty-two feet. A corresponding block of soft red hematite is seen on the other side of the arch, back of these two blocks are placed large blocks of brown hematite, and on these as a foundation are placed different ores, blocks of stone, coal and coke, arranged by contrast to show the products of mine and quarry.

The arch proper is seventeen feet wide, runs back fourteen feet, and reaching up to the ceiling of the Alabama state building.

The building stones, brown, gray and white are found in vast quantities in numerous places on the company's properties and are used for construction purposes.

There are also shown brown hematite ores from the Goethite mines in Tuscaloosa county, also from Shelby, Bibb, Jefferson and Taladega counties. Red ores from Stephens, Dago and Alfretta mines. Coke from the 400 ovens at Thomas, Ala., and coal from the company's mines.

To the foundryman this exhibit is very interesting, showing at a glance everything that goes into the composition of foundry pig iron, for the manufacture of which this company is justly famous, making annually 96 per cent (foundry iron) of its output of 120,000 tons. This high percentage of foundry iron is due to the uniformity of the mixture used in the company's furnaces and the steady use of brown hematite in such mixture, which ores it is said give the dark color and strength to the pig iron.

At the entrance to the Alabama building there is a large block of this brown hematite ore from the Pioneer Co.'s Goethite mine, weighing nearly fifteen tons, which was broken from a mass of ore at that mine containing over 125 tons and which is shown in

Fig. 5. These ores usually occur in pockets and it is very seldom that the boulders weigh over one ton. This exhibit has been much admired by foundrymen and by iron men and was well worth seeing. It is probably the most elaborate and artistic display ever seen in this country.

The Growth of the Technical Education Idea.

JUST to what extent the technical education being given to so many of the young men of the present day at the various universities, colleges and institutes of the country is likely to effect the mechanic of the future it is difficult at this time to determine. There are, however, certain phases of the subject that even now seem to be pretty accurately settled and which may be of some assistance to aid those interested in casting a horoscope of the future.

In the first place it is cultivating a greater respect for manual and skilled labor among a class of graduates who formerly spent their time in delving into the next to useless mysteries of a lot of isms and ologys, taught by venerable professors, aided by authors whose works and ideas were valued in proportion to their age.

It is turning out each year in this country actually thousands of young men better equipped for the business of living successfully in the nineteenth century than they could ever be by the highest classical education procurable.

These young men take with them into the various vocations they may ultimately follow well formed ideas of the great forces of nature and a fairly good understanding of the practical sciences of their day, all of which must be of the very greatest value to them and those with whom they are associated, and they are perhaps, unconsciously to themselves, exerting a force on the life of the nation that the future historian will recognize as a powerful factor in the development of American resources. How invaluable to the lawyer, banker, preacher, doctor, wholesaler and manufacturer or business man of any kind must be an education that teaches the sources and uses of electricity, the theory of the modern steam engine and the composition and nature of the earth's metals—to be taught how to make a wooden pattern, let it be ever so simple, to afterwards make the mold and help to melt the iron to pour the finished casting. And then to go to the machine shop, learn even in a moderate way to run a lathe, planer and drill, or shaper, and assemble the crude castings into a finished machine as is done now in so many of our schools.

The draughting room, pattern shop and machine shop all interest and aid to develop the best that is in him, while reading Greek, Latin and Hebrew in the original would be found in most of the cases to be valuable time worse than wasted.

Our National Government and many State Governments are doing a noble and patriotic work by aiding in every way possible the various educational institutions scattered over the land who are giving an increased amount of attention to the benefits of a mechanical education and leading their students to think of the future and its possibilities rather than the past and its musty traditions.

As an evidence of what our schools are doing in this direction the article appearing elsewhere giving a sketch of the apparatus and course of study at the famous Perdue University at Lafayette, Ind., will be interesting at this time. It is the first of a series that will appear from month to month and we hope may be the means of creating an increased degree of appreciation of the technical school and its work.

The Berlin Iron Bridge Co., at East Berlin, Conn., are running their works overtime, having plenty to do. They have just completed for the Bagley & Sewell Co., at Watertown, N. Y., one of the finest foundries in the State. They are now at work on a new casting shop for Randolph & Clowes, of Waterbury, Conn.; also a new foundry for the Newport News Foundry Co., at Newport News, Va.

ANY FOUNDRYMAN WHO KNOWS IT ALL DOES NOT NEED "THE FOUNDRY." THOSE WILLING TO FIND OUT WHAT OTHERS KNOW CAN DO IT FOR $1.00 A YEAR.

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

THE FOUNDRY

Published Monthly by

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DETROIT, MICH.

JOHN A. PENTON,

EDITOR AND PROPRIETOR.

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THE FOUNDRY is issued promptly on the 20th. of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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Trade Outlook.

While in some lines there is a continuance of the state of affairs noted last month, yet business holds its own for this season of the year in a way that is really surprising.

We doubt if any November in many years, or if, in fact, any previous November has ever witnessed the melting of as much iron as the November of 1895, and their are already prospects of a business boom in the early months of 1896.

As for pig iron, it has weakened considerably, but without any adequate reason. Stocks on hand have decreased steadily each month since May, and are still going lower. A buying movement on the part of some of the large consumers would start a stampede for cover on the part of the trade generally, that might surprise the chronic bears who like to predict low prices. The demand for many kinds of finished products remains unusually good, and many of the principal stove and agricultural implement concerns have sold their entire product for this year. There are no labor disturbances to mar the general feeling of satisfaction, and the country is getting too large to be effected materially by war scares or Presidential elections. Altogether 1895 closes with a more serene prospect for the future than has blessed this country in many a day, as far as its iron industries are concerned.

Is England Ahead of Us.

We have had our attention called to a recent English contract for railroad castings, covering a lot of some 50,000 tons, mainly consisting of saucer-shaped cast iron plates, weighing 94½ pounds each, and cast iron jaws weighing 14½ pounds each, two of the plates and two of the cast iron jaws forming, with wrought iron tie bars running across the track,, a complete metallic "sleeper." The interesting feature of this contract is the following extract from the specifications:

"All sleepers must be molded by machine. No hand-work molding will be allowed. * * * * Each cast iron plate is to weigh 94½ pounds, and each loose jaw 14½ pounds, and no plate wighing less than 93 pounds, and no loose jaw weighing less than 14 pounds will be accepted. Payment will not be made for any weight above 94½ pounds for each plate,

and 14½ pounds for each loose jaw, and the actual weight only if under these weights will be paid for. * * * * The contractor must cast twice each day, from the same metal as that used in the sleepers, two duplicate bars, 2 inches by 1 inch, and 3 feet 6 inches long, for test by tranverse strain—these bars must be cast with the broader side uppermost—and two duplicate castings of the form shown on the drawing, exactly 1 inch square for a length of 1½ inches in the middle, for test by tensile strain. One of the two bars for test by transverse strain must be tested on edge on bearings 3 feet apart, and it must bear a weight of 30 hundredweights in the center without breaking, and must give a deflection of at least .3 of an inch; and one of the two other castings must be tested in a suitable machine, to be approved by the company's consulting engineers to ascertain the tensile strain of the iron, which must be equal to 11 tons per square inch. The second test casting of each kind is to be marked with the date of casting, and put away for the subsequent inspection of the company's consulting engineers. Should either of the two bars tested for transverse and tensile strains fail to stand the specified tests, all sleepers cast on any date represented by such tests will be rejected."

While we doubt if practical foundrymen would undertake such a contract to be executed with ordinary foundry facilities and by hand, these specifications bear evidence on their face of a development of a respect for the efficiency of the molding machine in England. This is somewhat remarkable, too, as we do not believe that English molding machines equal in any respect similar machines of the best type at work in the United States.

Then, again, the specifications relative to testing and methods of testing provide most exacting conditions that it seems to us might, if literally carried out, work the greatest hardship. The idea of refusing to accept all the work poured on any certain day because one test bar might, through a flaw or other cause, fall short of the requirements, is, we think, a severe restriction; but if exercised with wisdom and fairness, and the inspection placed in the hands of conservative men, no doubt the very fact of there existing a possibility of its rigid application would have a most wholesome effect.

Appreciating that the foundry business advances in standing among the mechanic arts with every additional facility, such as power cranes, pneumatic hoists, sand conveyors, molding machines, testing machines, etc., we hope to see the day when foundries shall be respected for their equipment to the extent of specifications for large contracts discriminating in favor of the foundries best equipped, with the natural inference and expectation that the work turned out by such foundries will be superior to work made by cheap labor under dimly lighted sheds with no facilities for doing good work.

Krank's Korner.

We heard the other day that a well-known Foundry, somewhere between Atlantic City and San Jose, was on the verge of having its name called in a court of justice, there to appear as defendant in a suit involving its right to dupe the public in general.

* * *

The particular spot where they are alleged to have placed their crooked work is in a city hall. The defective castings consist of the same columns we often hear about, and the core has raised and cut through in some of them like they used to do for our grandfathers, but a few tricks have been invented since then and in the present case a judicious application of melted lead followed by a bountiful supply of paint and putty is the prescription employed to perform a divine healing.

* * *

The chief cause that leads to this kind of work being palmed off on an unsuspecting and innocent public is the low price at which such work is taken, no margin being allowed for doing a bad job over again. We stuck our nose inside an architectural shop early in our career and witnessed the rapidity with which building material is turned out. The chances for imperfect work were scattered thickly all around. The only precaution we recollect on the part of the moulder was to try the cope off to prevent a crush, but we don't blame him for he was kept busy till after wind time getting up his day's work, and if he did any reasoning or attempted to verify the correctness of things it was plain

that he was compelled to do this in time that should be allowed him for sleep.

* * *

The public is not so innocent either as might appear. Cheapness catches many a sucker and the public often appears in that role. They expect to get something for nothing or close to it, like the individual who pays a hundred dollars into an endowment fund and expects to get a thousand dollars back for it in five years. Such actions on the part of individuals indicate complete ignorance of business principles, and how often do we see the government of city or state award contracts that a consultation with common sense would reveal impossible to fulfill without resorting to subterfuges.

* * *

We are desirous of obliterating the cheapness spot from the cranium of the reader and will make special inducements and a liberal discount to illustrate this: Saturday night came around and we wanted to get shaved, customary charge, 10 cents, but across our path floated a sign "shaving 5 cents," and in an evil moment we concluded that here was a chance where we would be sure to have the best of the bargain. We don't want to lie by saying that we patronized the cheap shop with a view to economy, because we intended from the start to blow the other nickel in for the benefit of the inner man.

* * *

Reader, we did not get a 10-cent shave for our nickel, we got one worth not more than 5 cents and hardly that. We got no bay rum, no wax on our mustache, nor oil on our hair, we found none of Adeline Patti's face powder on our cheeks to give us the latest style in complexion. We evidently had too much beard for 5 cents since we found part of it standing in full bloom after that half-dime son of Barbertown got through with us, we found part of our whiskers gone forever, pulled up by the roots or cut out along with a piece of cuticle. If Mr. Armour, of Chicago, should see one of his hogs disfigured as we were he would start another technical school to appease the gods. We did not kick on our treatment, we wanted a 10-cent shave for 5 cents all right enough, but were not quite foolish enough to say so. We took this experience as a lesson and with the remaining nickel bought a drink with tacks in it to put our conscience to sleep. It has always puzzled us, however, to say what we gained by this transaction, if our skin is worth anything.

* * *

There are 5-cent foundries, too, and when you patronize them you get nickel castings. Hold on, that is wrong. You get castings that are worth only 5 cents, not 10, this is right. Cheap prices produce cheap work in the foundry as in the barber shop. When cheapness reaches that stage where it prohibits the employment of competent men and proper material, then the purchaser is duped because from the very nature of things no person can do business and give you more than a hundred cents for a dollar.

* * *

While we acknowledge that it is bad form to be dishonest, if you are found out, and entirely inappropriate to support a city hall with paint, putty, etc., yet encouragements are offered by the people themselves to do this. Foundries show an inclination on such work to turn it out at cost, and we doubt if anyone is benefited thereby, not exempting the taxpayers.

* * *

It kind of produces a pain in our Democratic backbone when we notice a foundry making money on a contract by resorting to questionable means. We believe the quickest way of stopping some of the vicious rate cutting about us is to keep an eye on the individual who receives an award under these conditions and if he does not toe the mark, shove it to him all you can and he will not care to repeat it. Let every foundry be compelled to deliver sound goods, free from moths, and then let the best win.

The Royersford Machine Co., at Pottstown, Pa., will erect a foundry for heavy castings, 42x5 feet.

The Bain Manufacturing Co.'s plant, at Charleston, Ill., has been sold to Messrs. Ramsey and Wells, of Greenville, Ind., and it is expected will be running full-handed soon.

More Smart Work.

OUR MAY ISSUE contained a reference to the disgraceful outrage perpetrated upon the members of the firm of the B. Atha & Illingsworth Co. at Newark, N. J., they having been arrested, released on bail and afterwards tried at the instigation of some over-zealous and ignorant government officials on the charge of endeavoring to pass off on the government some inferior steel castings.

The trial resulted in not only proving the falsity of the charges made but demonstrated the fact that the work in question would not only stand the severe government tests but was really superior to the quality specified. The complete discomforture of the prosecution or, more properly speaking, persecution, and the honorable discharge of the officials of this firm, together with the government's final acceptance of the work in question created considerable unfavorable comment at the time concerning the incapacity and prejudice of Washington officials. Now we have another case, more aggravated than the one referred to that displays a degree of assinine stupidity and venom difficult to understand.

The Penn Steel Casting and Machine Co. of Chester, Pa., of which Frederick Baldt, probably the most widely known and experienced steel foundryman on this continent, is manager, had a contract for some government work, and the authorities sent a self-opinionated inspector to look after it.

This gentleman (?), judging from his actions, could not have known much more about the work he went to inspect than an infant, but for fear that his verdancy might be suspected, thought he would do something to at once establish a reputation—and he did.

The fact of his being only six weeks off shipboard did not swerve him from his course, but he waded right in without waiting to find out a few elementary principles concerning mechanical work.

One or two samples will serve to show the character of the men sometimes sent out to inspect government contracts.

He went to the shop one day to stamp a test specimen on end and waited for it to be machined. Being a small section, it was of course hot when returned to him, owing to the friction of the cutting tool. He made an affidavit that he had received the test bar in twenty minutes from the time it was given to the machinist to turn up, and that it burnt his fingers when receiving it. He immediately made up his mind that the heat was caused by taking it to the blacksmith shop and forging it, then taking it to the machine shop, grinding off the original stamp and remarking with a false stamp, that it was then taken to the lathe, turned up and brought to him for final inspection.

Pretty story, more like a fable, of course, than anything else, but Mr. Inspector had to do something.

He was actually so ignorant that he did not know that piece of steel could be heated while being machined, but had that record to make, and so imagined that in 20 minutes his test piece had been put through operations that would have taken at least two hours.

Having struck such a promising lead he thought to continue his investigations.

One of his first ideas was to measure the test pieces before work was commenced upon them, to see that they were not tampered with. In doing this he took a piece of ordinary steel about 4½ inches long, ½ inch wide and 1-16 inch thick—not a rule—that was good enough for ordinary people, but an officer need not be conventional. It so happened that his little piece of steel was too short to measure the test piece, so he used his finger nail to make up the balance, and then called his little steel strip (not his nail) a "template."

This may seem like a newspaper story, but THE FOUNDRY has it on the best authority from parties in Chester conversant with all the particulars.

The idea of a man being selected for such important work who was ignorant of even the rudiments of mechanical work seems preposterous.

The time has got to come, if scandals are to be prevented, when merit and not political favoritism shall be the qualification for such a position. In this particular case the judge on the bench directed the jury to bring in a verdict of acquittal without even listening to the evidence for the defense, and they did so on the spot.

Mr. Frederic Baldt, against whom the main avenues of the prosecution was directed, is one of the foremost foundrymen of the con-

tinent and no man has done more to advance the steel foundry business or has successfully made more difficult work in that metal than he has during the past twenty-five years.

Mr. Baldt was born in Philadelphia in 1841, receiving a common school education, after which he served a regular apprenticeship as an iron molder in the Penn Works of Reany, Neafie & Levy during the time that Tom Brown, one of the Quaker City's prominent foundrymen, was foreman.

FRED'K BALDT.

As soon as his apprenticeship was served he went to Chester, Pa., and took charge of the foundry of Reany, Son & Archibold.

It was while employed here that a number of Chester capitalists formed a company, erected a small plant and commenced the manufacture of steel castings, sending to Scotland for a man named McHaffie to take charge of the work.

Mr. McHaffie, however, was not very successful, and on his return to Scotland Mr. Baldt was given charge of the plant, and his success there laid the foundation for the many great steel concerns located in that city.

As an evidence of his fame in this respect a great many of those holding important positions in the steel foundry business of the country have either served their apprenticeship or have worked for him in times past. Among this list might be mentioned:

Joseph Brown, foreman, McIntosh & Hemphill.

John Black, foreman, Pittsburg Steel Casting Company.

Eben Francis, foreman, Midvale Steel Works.

Harry Parish, foreman, Solid Steel Company.

Samuel Sweeney, foreman, Eureka Foundry.

Fred Cowden, foreman, Lynn Foundry.

John Murphy, foreman, Pencoyd Steel Foundry.

Frank Francis, foreman, Phoenix Steel Foundry.

John Mansfield, foreman, Anderson Steel Foundry.

William Delaney, foreman, Ben. Atha & Illingsworth.

John Collins, foreman, Buffalo Steel Foundry.

Dennis Egan, foreman, Sharon Steel Foundry.

A Pneumatic Traveler.

COMPRESSED AIR as a prime mover has in the past few years invaded many sections of the domain of mechanics. The power in itself is so tractable, and withal so easily secured and conveyed, that it is not at all surprising that applications of it are being multiplied everywhere. All modern machine shops with claims to progressive spirit, have air compressors, great or small, as a part of their equipment. Compressed air can be piped for long distances without material loss of energy; it can be passed through a machine and exhausted anywhere in a shop without the annoyance of escaping steam or flooding water; it does not require the services of an expert or technical engineer to keep in order the machines using it.

In a great number of places electricity is its competitor, and while it may never hope to displace this subtle agent in the bulk of its applications, there are still some conditions where compressed air is better adapted to the uses demanded; such, for instance, as where the power required is intermittent, and of comparatively short duration. The cost of installation and maintenance of an electrical plant often precludes its adoption

in small shops and foundries; while the rental charged by the electrical power companies, though not at all unreasonable, is no inconsiderable item in the expense account.

Under some such conditions compressed air will very easily prove its economy. Our illustrations show one practical application of pneumatic power to a traveling crane. This crane is used in the fitting-up shop of the Detroit Bridge and Iron Works to place heavy pieces of material requiring machine work on the beds of the machines that do the work.

Fig. 1 is a view of the end of the crane, showing both the lifting and traveling mechanism. The capacity of the crane is four tons, and the pieces are raised by means of a pneumatic hoist, with a lift of four feet, hung to a carriage that traverses the bridge of the traveler.

The bridge, which has a span of 45 feet, is moved forward and back by means of a small, reversible, rotary air-motor, a view of which is shown in Fig. 2. This motor is self-lubricating, oiling itself only when in use, and is connected by suitable gearing and shafts to the wheels upon which the traveling bridge rolls. The travel of the bridge is 80 feet, being limited only by the available length of the building. The handle for operating the motor is attached to the carriage,

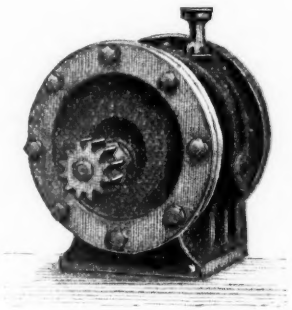

Fig. 2

and moves with it and the hoist the full lenght of the bridge.

The crane was formerly operated by hand

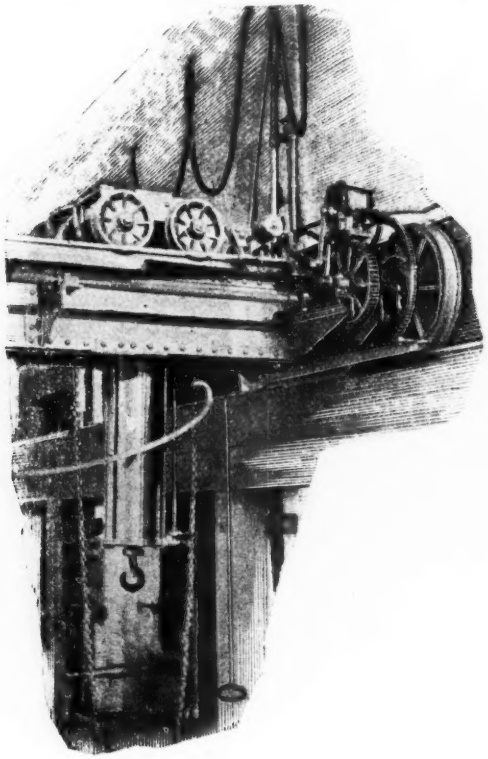

Fig. 1—Pneumatic Traveler.

power, and the movement of material was slow and laborious; with the present equipment it is as rapid as desired. The hoist and motor as here applied are the design of the Acme Hoist Co., of Detroit, Mich.

To Prevent a Piece of Wrought Iron Blowing.

Daniel F. Treacy, of the firm of Davenport & Treacy, New York, and Stamford, Conn., and himself a well-known molder in his earlier days, writes THE FOUNDRY as follows concerning the enquiry appearing in our last issue about the best method of making castings on cold rolled shafts, and expresses a wish that anyone trying it should communicate the result to him.

He says: "I have used the following mixture on brass and iron, and have cast brass and iron over it. I have taken a rusty shaft and given it two coats of the mixture and made a perfect casting of it.

Take equal parts of turpentine, balsam of firs and linseed oil, mix thoroughly together, and when not in use keep the vessel containing it tightly sealed.

To test this, go to any foundry and take a piece of rusty iron, wet it, and then give it a coat of this mixture. After drying, immerse it in the mixture and it will not kick."

I am very much pleased with your valuable journal, and think it should be in the hands of every progressive foundryman in the country.

CHAS. ALAND,
Foreman West Shore R. R. Shops,
Frankfort, N. Y.

Fire Fiend.

The Union Foundry, at Rockford, Ill., suffered from a severe fire November 10.

Cooper Bros.' foundry was destroyed by fire at Cortland, N. Y., November 26. Loss, $40,000; insurance, $20,000.

The stove foundry of F. L. Voeghtly, Allegheny City, Pa., was destroyed by fire November 20. Loss, $25,000; insurance, $8,400.

The Crete Manufacturing Co., Crete, Ill., was destroyed by fire November 14. Loss, $40,000; no insurance.

Among the Foundries.

Kelly Bros., at Goshen, Ind., have had a splendid year's business. They keep about thirty molders constantly at work.

The Springville Foundry and Machine Shops have been sold to H. H. Lang, of Buffalo.

The Elwood Radiator Co., at Elwood, Ind., have started up again and expect to have a large force at work soon.

The Dodge Manufacturing Co., at Mishawaka, Ind., have been running night and day for the past six months, and expect a busy year in 1896.

The Co-Operative Foundry, of Sandusky, Ohio, seem to be getting their share. They are working overtime right along, chiefly on work for outside points.

The Stockham Manufacturing Co., a new concern in Chicago, has purchased the brass business of Bennett & Johnson, and the Russell Bros. & Young Foundry, and will consolidate the two at the location of the latter.

The Southwark Foundry, of Philadelphia, have shipped on two specially built cars a monster fly-wheel to the steel works at Joliet, Ill. It is 28 feet in diameter, 4 feet across the face, and weighs 92 tons. It will take two months to get to Joliet, as it has to travel slow, and stop to have repairs made to cars to every 100 miles.

New Foundry Enterprises.

The Moore & White Co. are building a new foundry, 60 fet square, in Philadelphia.

F. . Pierce, of Broadhead, Wis., is erecting a new foundry in Coffeyville, Ks.

S. V. Benedict will rebuild his foundry at East Randolph, recently destroyed by fire.

McNab & Harlin will erect a large new brass foundry at Paterson, N. J.

George Crider has opened a new foundry and machine shop at Hicksville, Ohio.

It is said that some Chicago capitalists think of starting a malleable iron foundry at Muskegon, Mich., and have secured an option on the plant of the Muskegon Machine and Foundry Co.

Deaths.

P. H. Fitzpatrick, the well-known foundryman of Chicago, died November 14, as the result of an accident on a street car. He was standing on the platform, when the shafts of an express wagon ran into him. He was

born in Ireland in 1835, coming to this country when a boy. He learned the molding trade at Carbondale, Pa., removing to Chicago in 1860, and embarking in business. He was making arrangements to retire at the time of his death.

The Plumbago Club.

Well, it was a very gorgeous, swell affair, especially for some of the guests. To say they were hardly prepared for the entertainment the Plumbago Club had prepared for its friends at its recent Thanksgiving reception would be putting it very mildly.

Even the printed invitations were unique souvenirs that will likely be preserved as family heirlooms for generations to come. They were designed and completed at a new, modern printing office near Freeman avenue in Cincinnati.

It is true they were somewhat large, the designer having evidently seen one of A. Sorge's report sheets, but a small one, or in fact anything of an ordinary nature would have been out of place. One corner contained a large cut of a pile of plumbago, suspiciously like the Ceylon exhibit at the World's Fair, afterwards secured by L. S. Brown, of the Springfield Facing Co. (though how he did it no one knows). Another corner had a reproduction of a pyramid of barrels that resembled an advertisement for Paxson & Co.—supposed, of course, to contain the real article. A third had a representation of an interior of a modern, prosperous, up-to-date foundry with the inscription underneath, "They always use the best goods." while on the last corner there appeared a view of a tumble-down, dilapidated affair that no one would ever suspect to be a foundry, but bearing the inscription, "They always use the cheapest."

Aside from these illustrations and a border consisting of a wreath of molder's tools the invitation went on to recite that the Plumbago Club would be "At Home" on Thanksgiving evening from and after 8 p. m. No time limit was set, thus showing that they knew the peculiarities of their expected guests.

In small type at one side, were the words "Dress suits not necessary," and at the other, "Guests will please not talk shop." President Hibbs came early to see that all the arrangements were completed. He certainly appeared to great advantage, and a stranger would have selected him intuitively from the entire assemblage as the presiding genius of the whole affair. Notwithstanding the intimation concerning evening dress contained in the invitation, he felt naturally a desire to don his "swallow tails" and wore them with the air of one to the manner born. There aldays did exist about him and in all he did an air of natural refinement, possessed, unfortunately, by very few.

On this occasion, with his customary quietness, thoughtfulness and consideration of the interests of all others first, he managed to be almost everywhere at once, and greeted every new arrival with a welcome, the warmth and genuineness of which at once impressed its recipient and gave a quietus to the remark made by Mr. Hill to his friend Crivel that the president would make himself solid for twenty carloads before the end of the evening's entertainment.

Lack of space prevents us from describing the elaborate decorations or the arrangements made for the pleasure of those in attendance.

Two orchestras discoursed sweet music in different apartments (in different keys) and as the various guests met and were introduced to each other they passed on to a side room presided over by Mr. Russell, of the Phoenix Iron Works Co., and S. T. Johnston, of "Whiting's cupola."

Everyone seemed just a trifle eager and anxious as they parted the portieres and entered and appeared very happy as they came away.

sembled an advertisement for Paxon & Co.—

As all present wandered about and admired the home of the famous organization, whose guests they were, they naturally became divided into little groups of twos and threes, etc. In one corner stood H. O. Stone, of the Pennsylvania R. R. shops at Altoona, together with C. T. Holbrook, of the Juniata Furnace Co., J. Bougher, of Paxson & Co. The latter ter was describing some incidents in Atlantic City during the summer and seemed especially to enjoy the experiences of a Kodak fiend who had spent a day or two getting the ladies to pose for his camera on the beach and after taking a hundred negatives returned in triumph to Philadelphia only to find that through a mishap there was not a good one in the lot.

Sitting together on a sofa were Lafayette Crowley, of the Detroit Stove Works, and Chas. Herron, of the Ross, Meehan, Brake Shoe Co., talking about old times "Over the Rhine" in Cincinnati, while Wm. Ferguson, of the Gates Iron Works, and John Smith, of S. F. Hodge & Co., stood near by discussing something about "loam," "sweeps," "copes," etc., whatever they were. John Pettigrew, of Joliet, Ill., and A. Sorge, of Chicago, had a consultation about something evidently important, the only words escaping them being the ones "new shop."

S. Groves, of Pittsburg, explained to J. T. Rowland, of Racine, his ideas of molding machines, while E. J. Welch and John Meehan, of Chicago, and Wm. M. Wilson, of the Cleveland Facing Mills Co., seemed to enjoy some reccolections of some Milwaukee incidents.

Probably no one present attracted more attention than James Chalmers, whose biography, now being published in serial form, all had read. He was constantly the center of a group of admirers, all of whom knew him and seemed desirious of congratulating him on his literary efforts. Among the number were P. J. McNamara, of Indianapolis; H. H. Garret, of Pittsburg; T. F. A. Lutterman, of Toledo; Thos. Cowie, of Kansas City; M. A. McPherson, of Detroit, and H. J. Graf, of St. Louis.

After sufficient time had been spent in renewing old friendships, a work that was carried on quite rapidly (especially in the neighborhood of the "office" as the room presided over by Messrs. Russell and Johnston was called), the guests were invited into the large reception room, where in the dim light, to the time of slow music, all found chairs and a number of attendants in a white uniform (the one used exclusively at the club), who passed cigars and other things to those in need of them. After the orchestra had played "As Welcome as Flowers in May," the president said it gave him much pleasure to welcome the guests to their club. He felt that no one had a better right to be there. He reminded them that it was the foundrymen of the country who used the plumbago that was prepared by the manufacturers who employed the salesmen who earned their money and saved their cash to furnish this club to welcome their friends. (Cheers.) He was glad they all felt happy and hoped they would be still happier, though he of course knew that happy foundrymen were seldom still. He said the club had spared no expense to show their appreciation of the many kindnesses received during the past year and their contract with the caterer provided for everything and that carriages, ambulances and medical aid would be provided gratuitously.

The first thing on the programme was a living picture, he said. After the lights were turned out the curtain rose upon a familiar scene. A well known traveling man from Chicago, named Wilson, appeared endeavoring to secure an order for a carload of C. F. M. facing and, judging from appearances, was about to succeed. Act 2 showed the arrival of Geo. Crivel just in time, and as he sailed in to knock the first comer out by offering a cheap cigar to the buyer the latter looked worried and the former mad clean through. Act 3 proved the truth of the proverb about troubles not coming singly, as a third one came in the shape of W. H. Fitzpatrick, of Paxson & Co. Wilson looks desperate. Crivel tries to lead the buyer off to one side, and "Fitz" commences to take off his coat and rubbers with the air of a man who meant business and had come to stay. The buyer, however, is seen pushing a button and the curtain goes down while the two hundred present hold their breath in the most intense excitement.

Scene 4 is more exciting than a three-ring circus, as it shows a mob of twenty-five molders armed with shovels, rammers and clamps, throwing the poor salesmen through windows and doors, while the buyer has fallen in a dead faint. At its conclusion the orchestra played "Over the Garden Wall.'

Next came a new song by Mr. Johnston entitled "Scotch Lassie Jean." It might be mentioned that Mr. Johnston was feeling just right and the song was a success. He mistook the audience's laughter for an encore, however, and his friends, had to persuade him to give some one else a chance.

The orchestra then played "Bonnie Laddie." Mr. Crivel sang "Oh Promise Me," and after he sat down Mr. Hill endeavored to secure his promise that he would never sing it again, but failed.

The orchestra kept things lively by playing "A Man's Best Friend is His Loving Wife." All this time the attendants had been

kept busy and the very best of good feeling continued to prevail. John Hill had been called upon for a speech and said he was glad to see so many good friends there, in fact he believed they were all his friends or would be if they knew him better. He spoke proudly of the Plumbago Club he had helped to found. Those in it would stick to the foundrymen of the country just as long as they could get an order. Some of them were criticised occasionally for poor goods, but it was not their fault, but the fault of the people at the office. The members of the club considered themselves as being just the agents of the foundrymen and their lives were devoted to the unselfish work of doing good, etc. He was cut short by loud cheering in the outer room, where some of the guests had mounted tables and were making speeches against time, while others were trying to crowd them out by singing "My Nellie's Blue Eyes."

The uproar got louder and louder; everybody seemed anxious to make a speech or sing a song. Those more quietly inclined had gone home some time before. There is no knowing how it might have ended but for the entrance of a police captain and several officers, who informed them all that it was nearly morning and the people in the next block could not sleep, so after those who were able had sung "Auld Lang Syne," the first reception of the Plumbago Club came to an end.

Pittsburg and Vicinity.

The past month has produced absolutely nothing new in the iron and steel trade. The demand seems to be decreasing and there is a tendency toward lower prices. The entire market seems to be nearing the conditions which prevailed previous to the improvement. Of course, at this season of the year, more or less dullness is to be expected, but the present status of the trade was hardly expected.

In nearly all lines production is keeping up at a lively rate, and unless consumption greatly increases, there will be a piling up of stocks before long. As has been for some time past, both sides of the market continue to hope for better things.

Foundry and forge irons have weakened generally within the past week or so, while the drop in billets and Bessemer has not stimulated buying beyond present requirements.

It is thought that prices will have to tumble again. There is very little room for this, but whatever little room there is, it will be taken up. To all appearances an accumulation of stock will soon begin. Furnaces have hardly caught up with orders placed some time ago, but when they do, they will soon be away ahead if they continue at the present rate of running. Pig iron buying for the coming year has hardly begun yet, as makers will not consider long contracts at present figures.

Following are the ruling quotations for different grades of iron:

Grey forge	$12.00	@$12.25	Cash
No. 1 foundry	14.25	@ 14.50	Cash
No. 2 foundry	13.25	@ 13.50	Cash
Bessemer	12.75	@ 13.00	Cash
Charcoal Foundry No. 1.	17.50	@ 18.00	Cash
Charcoal Foundry No. 2.	17.00	@ 17.25	Cash
Charcoal Cold-blast	24.00	@ 00.00	Cash

Rolling mill castings are not in such a good demand as formerly, as contracts are not being pushed to any heavy extent, owing to the lateness of the year. Prices are being quoted as follows:

	Cents, per lb.
Chilled rolls, up to 12" diameter	3¾
Do. over 12" diameter	3¼
Sand and Homogeneous steel rolls and pinions up to 12" diameter	2¾
Over 12" diameter	2¼
V-tooth pinions, additional	¼
Housen and rolling mill castings not otherwise specified	2
Spindles and coupling boxes	1¾
Squeezer castings	2
" pinions and wheels	2¼
Spur and bevel wheels, large	2½
Spur and bevel wheels, small	3 to 4

Pig Tin.—The market for this metal remains quiet, but the demand is still large enough to keep handlers fairly busy. Prices range from 16c to 16½c for smaller quantities.

Copper.—This branch of the metal market is very unsettled, and prices are a shade weaker, the figure being places at 11 cents.

Pig Lead.—The large supply and the moderate demand have caused another drop in prices, which are now ruling at 3.30c for carload lots, and 3.40c for smaller quantities.

The Damascus Bronze Company has enlarged the capacity of its plant in Allegheny by the addition of a 700-pound pot and a new core oven. The production of bronze castings for the month of November amounted to 450,000 pounds, but with the above additions the capacity will be increased to 600,600 pounds per month.

Messrs. Phillips & McLaren have succeeded to the Fisher Engine, Foundry and Machine Works, carried on by the late Wm. Fisher, at Twenty-fourth and Smallman streets, this city. Mr. Phillips formerly had charge of the busines department of the firm and Mr. McLaren was manager of the mechanical department. The firm will continue the manufacture of machinery and castings for mills, steel works, etc.

What is said to be the largest casting ever made in Beaver Valley, was poured at the foundry of Knott, Harker & Co., Beaver Falls, a short time ago. Almost four tons of molten metal were poured into the mold. The wooden flask in which this casting was made is eight feet wide, 14 feet long and almost five feet high. The casting is a bedplate for a set of rolls and is cast with pillow blocks all in one piece with the bed-plate. Much trouble was heretofore experienced in getting this particular machinery to remain solid, and so the idea of making a bed-plate in one piece was attempted.

The charcoal house of the W. Dewees Wood Company's plant, at McKeesport, was recently destroyed by fire. The building contained 86,000 bushels of charcoal and the fire burned furiously in the center of the heap, causing a loss of $20,000.

The Baker Forge Company, of Ellwood City, is building an addition to the present plant in order to double the output. The company will specially fit up the plant for the manufacture of bolster plates, ring bolts, etc., in order to cocmplete its line of wagon hardware. The works are being operated regularly, only two stops of two days each being made since the company started in July, 1894, these being occasioned by lack of coke.

Pokey's Pointers.

SAY, Dick Sanders," said Tom Bowers as the former made a move to get out of sight, "how does it come that you lost that bedplate?"

"Can't account for it, sir; done the best I could. It is the way of Providence, I guess."

"That will do, Dick. If that is the way of Providence, it is a mighty poor one, anyhow, ain't it? Some molders lay their blame for bad work on luck, but you are going a step further. I think the trade is being elevated all right enough, though I sometimes agree with Liverpool Sam, when he gets an 'h' before it, and says it is being 'helevated.' I find that we are making material progress in turning out excuses; they are shiners, sure enough. If the castings were half as slick I wouldn't use plumbago any more.

"Now, Dick, my idea of a bad casting is that it is very often caused by mixing foreign materials in your sand. Some molders mix politics, whisky, agitation, society, scandals, three-carde monte, farming, fishing, railroading, and many other substances in their sand heaps, and when the iron strikes a mold with such stuff in it, it refuses to be comforted and feel at home, as it should, and we we see it blow up and run out. Now, Dick, is it right to hold Providence responsible when you mix your sand in that way? I believe you mix too much religion with your work, Dick—you get too high a percentage of it, so to speak. Now that bedplate has been lost four times. First I put McCarthy on it, and the day he made it Providence, as you call it, got him into an argument with that Cockney, Davis, in regard to Ireland's right to freedom. You know yourself how it ended. McCarthy came out on top, chewed Davis' ear off, and his casting, the bedplate, came out through the bottom—forgot to secure his flask sideways and she stretched. Maybe you will say it was done by the will of Providence, but I ain't going to go as far as that for a cause. McCarthy's mind was back in old Ireland that day, and he ought to have been there, too, as far as that is concerned.

"Let's see; who was next to make it, or rather not to make it? Oh, yes, that Dutchman who quit—Guckenheimer, or whatever his name was ;quit as a proof of his innocence. Poor way of establishing an alibi, Dick. Providence or anything elese never

old Yankee laborer, Fremont, about sauerkraut, and the Yankee insisted that turnip-kraut, by gosh, beat cabbage-kraut. Guckenheimer got rattled, because anyone should dare to advance the idea that the pickled flower of the Fatherland could be superseded by such a thing as turnips. You know the result—forgot to wedge a chaplet—the casting bad. The fact that he quit does not clear him of guilt. His mind was some place else.

"Jerry Simpson was the next victim; the day after paying, it was, and Jerry had a bottle hid out in the sand shed. I knew it, because he kept on eyeing me. I found him missing several times during the day, and the next day I found a good casting missing. Jerry's bedplate was going up while the whisky was going down. It was a case of plain drunk, and I wish I had the authority to give him ten dollars or ten days.

"Then I trusted that job to you, Dick. My instinct told me that you were the man, and I will trust you once more."

"I will get it out sure,' said Dick, as he brightened up with the thought that his case had been disposed of.

"Don't be in a hurry. I ain't through with you yet. I want you to do a little thinking, Dick," said Tom, as he gave a hard look at a molder who attempted to roll a flask over without clamping it, and had the whole thing fall out. "Accidents made to order" is the term Tom applies to this kind of time-saving.

"Dick," began Tom, "you used to be a hard pill, and a couple of years ago you joined the church and began to behave yourself, and I think a great deal of you for that. But yesterday, it seems to me, that you took a couple of hours of the shop's time to read a lecture to Kelly upon the evil consequences of chewing tobacco. I have no objection to you converting him, but you must not interfere when he is working. I know he is pretty bad that way, but then he never has to look around for a swab-pot, you know, so I think that in his case tobacco serves a useful purpose—the end justifies the means. Well, he refused to be convinced and you got excited, went for some paper and read extracts therefrom to sustain you. Now, Dick, you must not use this foundry during working hours for revivals, not that kind. If you revive some good castings you can go ahead; but if you are going to preach the gospel here we will have to take a day off. It may be a fine thing to know all about the resurrection, like I heard you explaining to Grogan, but it is equally and more important to us that we should resurrect some good castings. You see that trail leading out to the scrap pile? It is being worn down too deep from continual use, and the largest part of travel over that path is caused by keeping one eye entirely on something else besides your work, and taking the other one off occasionally.

"Well, turning back to that bedplate, you kept thinking what a vile old reprobate Kelly was, and all the while you were making a vile, reprobating mold. Your casting shows that, and now you want Providence to shoulder the responsibility, do you? You are wrong; your mind was not on your work, and if I was furnishing the money to run this concern, it would pain me to hand over a day's pay to you for the wreck your non-attention has caused."

"But religion is a good thing," said Dick.

"In its place, Dick. In the present case you have used it in such a way that it has resulted in the same damage as McCarthy's Irish sentiments, Guckenheimer's sauerkraut exhortations, and Jerry's whisky. All of these things were used in the wrong place, at the wrong time.

"Just to give you an illustration of the truthfulness of what I am saying, look at Joe Smith now. He is classed, I believe, as one of the most perfect billiard players in town. He has got a very delicate touch about him, they say, when it comes to handling a cue, but he can't put any of that into his rammer when it comes to using that. There he is now, his rammer going up and down, and his eyes towards those high school girls going by. Between flirting and think of billiards, I don't wonder much that there is always something wrong in close proximity to him.

" I have got too many molders here who will have to turn their attention to their work a little more, or else I will be compelled to let them take Greely's advice and go west. Only the other day I caught Mike and the coremaker in the oven with a Police Gazette, arguing the chances of Corbett being licked by Fitzsimmons. I never say a word if they choose to give testimony and advance their ideas about things concerning the foundry. I don't care whether they fight or pray about

it, as long as it is something belonging to their business; but spending the firm's time to settle foreign matters has got to be stopped.

"The other day Price was in such a hurry to go out and see a compound locomotive that he pulled the hub off a pulley he had just cast. Now, Dick, there are plenty of compound things here in the foundry; but the trouble with molders is that they would rather be talking about something they need not know anything about than to try and find out things they ought to know.

"Some of you gentlemen may imagine that because you patronize Pokey's Sunday school and look righteous for a couple of hours, you can hold your jobs forever, but if things don't change for the better soon, I will prove to you that you must answer to the business side of this concern also. I will veto your perpetuity of job holding, and Pokey will sustain me too. I know he sometimes has a kind of a pious air about him as if he had no troubles and trusted everything to a higher power, but he fools you sometimes. When he brought that model church member down here to run the engine, everything went very fine till Pokey found him one day without any water in the boiler. Just then Pokey concluded not to trust too much to Providence; the way he raked that fire out was a caution, and the way he fired his model young man in spite of his protestations that he had been reading the Revelations, was in itself a revelation. Pokey evidently didn't want to climb the golden stairs by the boiler explosion route. There are a great many things that cursing and praying alike fail to affect.

"When I was a boy back in Delaware," continued Tom, "the old man gave me a chance and the casting was lost, and I tried to explain to him how it came about in three languages, English, profane and vulgar; principally the latter, but with his large experience to draw from, he outdone me, but gave me another chance and I lost the casting again. Then I changed my tactics, went by chance to a protracted meeeting, and was convinced that I lost the casting as a punishment for my wickedness, but I knew there was a certain disagreeable punishment coming in the morning when the old man came around; so I got filled up with faith, strong in the belief that he would never take any notice of my bad job. My faith was so strong that I was all smiles, when a familiar voice said, 'What are you grinning about this morning, you rascal. Come out here and explain." That settled my faith and, Dick, while the faith cure may heal humans, I have never seen it mixed strong enough to change the appearance of castings. You have heard of Napoleon's saying that the Lord is with the largest cannon. So He is with the best mechanic, with the man who uses the most clamps.

"Remember, Dick, that it is good Christianity to tend to your work; it is good religion to keep your mind on that in which you are engaged. That is what makes great men. Your are earning your wages in the foundry. Give it your attention at least while you are here, and you will find Providence on your side."

With this Tom strolled off in the direction of Bob Wilson's floor, to interview that gentleman in regard to a drop that occurred yes-

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Notice

Advertisements Entitled Situations Wanted, or Situations Vacant Will be inserted in this column one insertion FREE. All others 25 cents per line.

WANTED—Position as foundry foreman by experienced man on all classes of work. Address C. H. McALLMAN, Peoria, Ill.

WANTED—A position of trust in some large (prosperous) malleable iron company; can erect and operate melting furnaces, grade and mix iron; references; correspondence solicited. Address C. B. M., care of FOUNDRY.

WANTED—A foreman for the machine foundry of a large manufacturing company. Must be capable of handling sand and loam work. Address, stating age and experience, P. O. box 175, Cincinnati, Ohio.

BRASS MOLDER—One who can make smooth casting true to patterns for light jobbing work and understand mixing metals; the right man can have steady employment. Address THOMAS DEVLIN & CO., 3d and Lehigh Ave., Philadelphia.

CAPABLE, up-to-date foreman for our New Jersey foundry, doing fine stove plate and bench work; to insure attention, state age, and inclose references as to ability and habits. Address WALWORTH RUN FOUNDRY CO., Cleveland, Ohio.

WANTED—Position as foundry foreman in malleable shop; thoroughly understand all kinds of work, especially construction of

annealing furnaces and their management, etc. Address J. K., care THE FOUNDRY.

WANTED—To correspond with parties who are in need of a foundry foreman; have had 20 years' experience in the business. Address D. F. SLADE, 3952 Poplar street, Philadelphia, Pa.

FOR SALE—Practically new No. 4 Whiting Cupola, sold on account of enlarging plant. Address W. O. G., care THE FOUNDRY.

A Rubber Tipped Rammer.

A Difficult Casting.

It would be a difficult matter for any observant foundryman to pay a visit to any of the large foundries of the country, or, in fact, many of the small ones, without seeing something out of the ordinary, and worthy of note. Among the many interesting things seen during a recent visit to the works of the Brown & Sharpe Manufacturing Co., Providence, R. I., was the rubber-tipped rammer, designed by their well-known superintendent, Mr. R. Viall. It is claimed that all injury to patterns through striking with pean of rammer is by their use entirely avoided. Our illustrations give a very good view of rammer, with tip attached. Fig. 1 gives side view, with part of casting removed. It will be noticed that the end of rammer is cored out to permit of the insertion of shank of tip, which is made of a special grade of vulvanized rubber. After it has been driven in, two small steel pins are driven through, holding tip most securely.

Fig. 2 gives an edge view, which is self-explanatory.

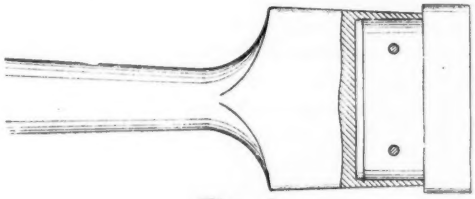


Fig. 1

There are many other advantages claimed for rammers thus equipped, such as ease of working, as to a certain extent it rebounds when being used.

Fig. 3 gives a view (made from photo) of

Fig. 2

what THE FOUNDRY thinks is the most complicated and difficult piece of all green sand molding it has ever seen. It is a bedplate for a Mergenthaler Linotype setting machine, made entirely with green sand in a three part flask, and only three small green sand cores for bolt holes, a molder and apprentice making one a day, and is really a most difficult piece of cast iron work.

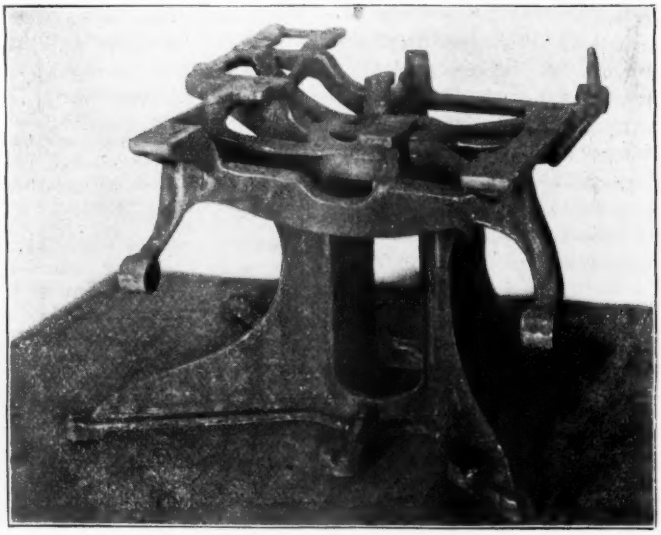


Fig. 3

Cincinnati's Great Bell.

W. J. TOBIN.

LITTLE by little America is snatching from the Old World, through the progress of her arts and sciences, the glory that was Europe's for so many centuries. A very recent and notable evidence of this assertion is the masterpiece of tuneful bronze cast in Cincinnati on October 30, at the Buckeye Bell Foundry, operated by the E. W. Vanduzen Company. The mammoth bell is the crowning art work of a concern which has been in operation since 1837, and the outcome can hardly fail to elate the foundrymen of this country, because it elevates them as a class and brings their craft into a place of special prominence among their fellow artisans. It will be strange indeed if they do not profit handsomely by the impetus which the business must receive in consequence. While it is true that bell founding is only a branch of this mechanical art, its achievements redound to the family of foundrymen, and therefore to the individual members thereof.

Rev. A. M. Quatman, pastor of St. Francis de Sales Church, East Walnut Hills, Cincinnati, a clergyman of learning and forcible individuality, conceived the idea of casting a great bell for his Gothic edifice. Mr. Joseph Buddeke, a wealthy merchant, member of his congregation, now deceased, put it in his power to carry out the project by bequeathing $10,000 for the purpose. When the contract was let this sum, in the form of interest-bearing bonds, was deposited in bank to meet the obligation. The dimensions of the bell are: Diameter of the rim, 9 feet; diameter of crown, from outside to inside, 5 feet; height, 7 feet; weight of clapper, 640 pounds; weight of yoke, approximately 3 tons; total estimated weight of bell, yoke, standards and wooden beams, as the bell now stands in its place of exhibit, 43,000 pounds. The half-tones illustrating this description were made from photographs taken, and will be used in a descriptive pamphlet to be printed by St. Francis de Sales Church.

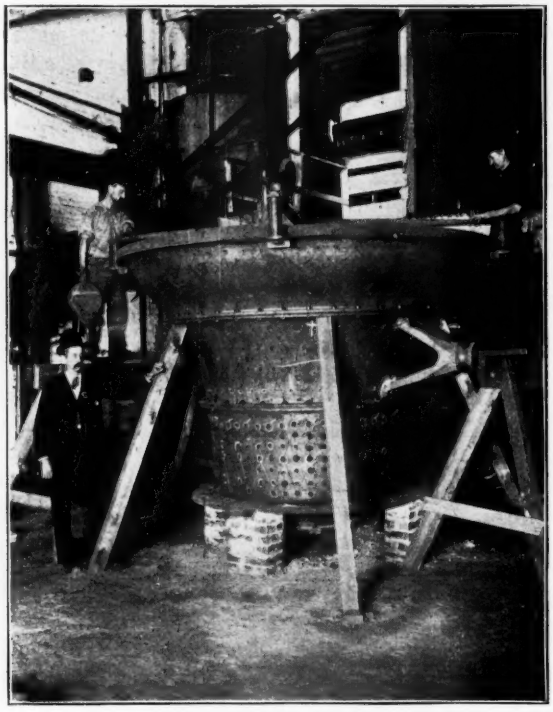
Great stress was laid by the pastor upon the element of tone, as he was desirous of emulating the bell of Erfurt, to which authorities on the subject give the palm for tone quality over all the other large bells of the world. It is a remarkable fact that many of the monster bells have become as famous for their dismal shudders as for their immensity. It was to avoid this odium that the matter of tone was made a great desideratum. He wanted an E flat bell, but it turns out that the pitch is E natural—old concert pitch, or half a tone higher than was intended. A margin of an eighth of a tone sharp or flat was to be allowed, which would be considered as "in the line." But in view of the bell being a perfect E, and the uncertainty of recasting, the result was acceptable, particularly as the tone was harmonious and sonorous, so pronounced by Mr. Albert Krell, Sr., an old violin maker and a large manufacturer of pianos in this city.

Although the Buckeye foundry was well equipped for casting bells of large proportions, special preparations had to be made to meet the present requirements. The foundry had three reverberating furnaces, sixteen feet in length and forty-four inches in width. They were all pressed into service, the metal averaging twelve inches in depth when in the molten state. Two of these furnaces occupied places along the walls of one apartment, meeting at the angle in a common reservoir; the third, which held the reserve supply, is in an adjoining room, the metal it contained being trucked to the mouth of the mold in ladles. A pit ten feet in depth and fifteen feet in diameter was dug close to the two furnaces and was substantially walled up with masonry. On this a crane was rigged. Two wooden runner boxes, lined with fire-brick and coated with black wash, connected the spouts with the mold, coverings of fire-brick being laid on at the pouring, after drying the troughs well with charcoal, great care being taken to blow out all the dust. The cope was kept in place by thirty wrought iron screw-clamps.

The core and cope casings were of cast iron, perforated, from five-eigths to two inches in thickness. These casings were in three sections, corresponding to the crown, waist and bow of the bell, and were bolted together by means of corresponding flanges. The mold rested on brick pillars sufficiently elevating it above the bottom of the pit to admit of passing beneath it to the interior of the core. It was feared that the core had yielded to the terrific pressure at the pouring, and Mr. George Vanduzen, who superin-

tended the operation, thought of sending one of his men to inspect it, but as he himself would hardly have the temerity to brave the danger, he concluded not to jeopardize anyone else. The reason for suspecting the core was that the metal was running short before the mold gave evidence of being filled. Though the third furnace had about 4,000 pounds, and all of it was used, there was only about 900 pounds of metal poured which did not go into the casting. This would argue that the bell was of great density and all the more valuable as a casting on that account, the specfic gravity being accordingly increased. The casting has not yet been weighed, but it will approximate 30,000 pounds. It will be put upon the city scales to determine its exact weight, setting the speculation in one instance, at least, to rest concerning the weight of a great bell. Statistics of bells in this respect are very variable. Sir Edmund Beckett, the English authority, gives the weight of the Montreal Cathedral bell, which has held first place on this continent, as twelve tons and fifteeen hundredweight. He says he heard it before it left England, and classes it among the bad-toned pealers. Other weights from what appear to be less authorative sources, give the weight as greater than Beckett's record.

The average thickness of the loam on the core and cope was two inches, hay rope being used in the core to give play for shrinkage and assist in carrying off the gas, and wire interlaced the loam of both core and cope. The sweeps in each instance were fixed with a spindle, the cope being inverted during the "sweeping" process, which required great nicety of workmanship, the last coating of loam being poured on at a consistency not much greater than that of water. These sweeps are guarded like the apple of the eye, as, of course, they contain the whole secret. In the main, however, the empirical rule was that of the Westminster bell, and after many experiments on Beckett's plan, which closely conforms to the quadrant of an elipse. To ascertain the correctness of the rule adopted

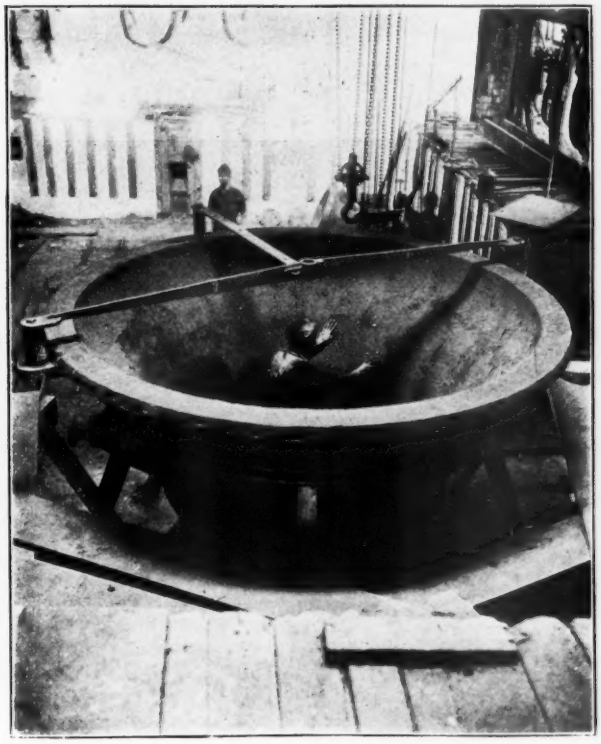


EXTERIOR OF CASE.

in this case, two experimental bells were cast, weighing about 400 and 4,000 pounds respectively. In each instance the result was most satisfactory to the founders.

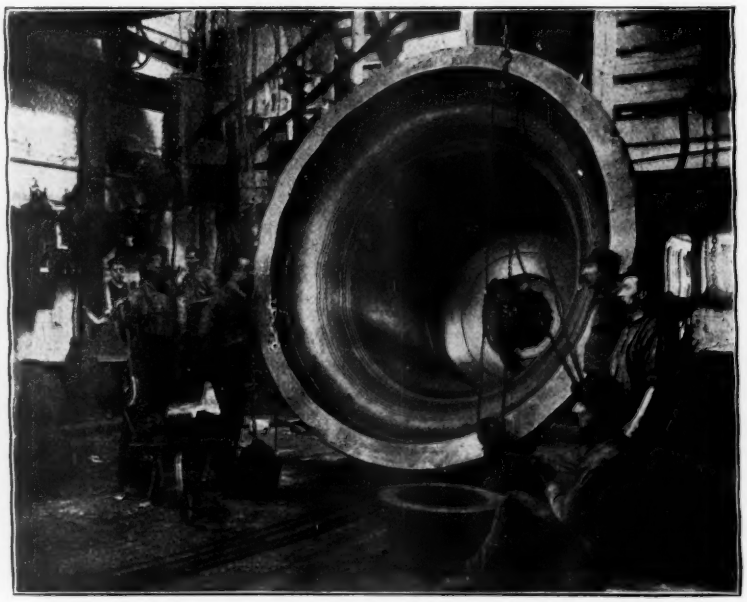
After drying, portions of the loam of the cope were removed to a suitable depth, fresh loam inserted, and the ornaments impressed with stamps, the sweep being constanly employed. The ornaments are medallions, six around the crown and seven on the waist, three of the latter in one group and four in the other on opposite sections. Between the crown medallions (of the church trustees) are narrow bands in relief, out of which will be carved in relief by etching away, six Latin sayings about bells. Mr. A. Mundhenk, who established the first foundry west of the Alleghenies in this city for bronze sculpture work, made the stamps for the medallions. They were first carved in wax, plaster of paris negative made, then a positive of the same material, and, finally, an electro made and backed up with lead, after having been bent in the double curves required by their positions—vertical and horizontal—on the crown and waist respectively. It was intended to cast the Latin version of the Lord's Prayer immediately above the sounding bow, so as to form a complete circle at a place where the bell would measure 260 inches. The Gothic letters were cut of leather and cast in Brittania metal for the purpose of impressing them in the cope, but it was feared at the last moment that the narrow walls of loam which would separate the words and parts of letters would give way before the rush of the metal and thus form a dangerous dross. So this was abandoned. However, this and other ornaments will be etched in the casting and laid on in Mosaic.

The founders intended to make a quick casting, allowing both furnaces to feed the mold simultaneously; but one of the plugs gave way a few minutes before they were ready for the pouring. So perfectly well ordered were the twenty men engaged that not one of the hundred spectators even guessed



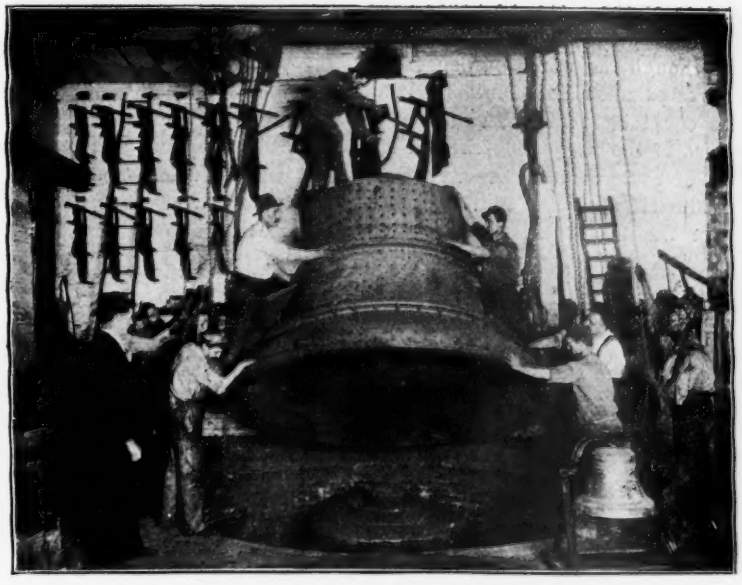
INSIDE OF CASE DURING PROCESS OF SWEEPING UP.

CASTING PIT WITH PARTLY FINISHED CASE SHOWING METHOD OF BINDING WITH WIRE



TURNING THE CASE SHOWING FINISHED MOLD.

"BLESSING THE METAL" AS THE POURING COMMENCED.



REMOVING THE CASE AFTER THE CASTING HAD COOLED.

at a mishap. The twelve gates which received the metal and three vents worked admirably; the head box having been dried by inserting a small charcoal furnace. There still remained a few ingots of bell-metal which were to have been added to the near furnaces, when the plug gave way. Sixteen thousand pounds of the alloy, which was 78 per cent copper and 22 per cent tin, had been mixed previously and run off into 120-pound ingots, the balance of the mixture being made at the time of casting; coal was the fuel employed. The pouring was scheduled for 3 p. m., but it was 9 when the plug flew and 9:50 when the trickling stream of the second trough froze.

To the uninitiated observers—the writer being among the number—the casting of the bell was a memorable spectacle, most of the spectators having been gradually worked up to a high pitch of expectancy during six chilly hours. There was a very uncanny light in the foundry, save when a furnace door was lifted to feed ingots, which were handled by brawny men as though they were so many blocks of wood. One aged stoker was a veritable Vulcan, who wielded his long iron bar like a tragedian, striking unconscious attitudes with the full flare of the furnace upon him, like those of an elder Booth, a Forest or a Barry Sullivan. Although within ten feet of the mold, he never gave it a look, but played his part without a hitch or a halt, as though the whole burden of responsibility rested upon his shoulders. The painter who could have caught and kept a mental picture of the wiry, deep-chested old warrior until he could fix it on canvas, would have made himself a name. Moving about noiselessly in the half-light, the workmen took on an air of mysteriousness not unlike the witches in Macbeth. The sullen roar of the furnace but added to the alchemic aspect of the scene and sent the vivid imagination back into the age when man, bent upon coining gold out of the baser metals, toiled with fires and chemicals in weird, sequestered places. The nerves seemed to draw to a tighter tension as the moments flew, and the eyes grew owl-like with their watching. Women whispered and men spoke sotta voce. The burial of Sir John Moore was not more solemn.

But a mild commotion broke the spell when the lava stream rolled down the narrow race, an unusual activity bestiring the men about the mold. Striking the cold basin, there was a metal fountain made which cast sprays of sparks high in the air amid luminous fumes, as though it were a minature Aetna erupting. Mr. George Vanduzen, like the true Knight of Labor, held his ground at the mouth of the mold and gave his orders in a clear, quiet tone. The stokers were urged to prod their fires; others to watch the slag with long poles; more to truck in the great ladle, which was soon swinging in readiness; and others again to lay the fire-brick over the troughs. Men leaped to and fro over these troughs, assisting their fellow-workmen to empty smaller ladles into the troughs as the flow from the second furnace diminished and the great ladle had poured its full quota. While the second furnace was emptying, an endeavor was made to heat the first with but slim success, and when someone said, as the white stream from the second furnace grew red and sluggish, "Shut 'er off, she's frozen," the glowing charcoal above the gates of the mold made it difficult to tell whether there was enough metal to feed the shrinkage or not. A number of iron molders, who were there at their own request, shook their heads doubtfully. In answer to the question whether he thought he had a casting, Mr. George Vanduzen quietly replied, perspiration streaming from his face and arms, "I hope for the best."

Some thirty-six hours after the pouring, the work of removing the cope was commenced. The core adhered very tenaciously and was only loosened after considerable manipulation. Between 800 and 1,000 pounds of metal were found in the loam and the surface of the core was fused for a quarter of an inch until it resembled the metal itself, the metal having entered it in places dangerously close to the inner side. Threads of metal could be picked out, showing that the most remote interstices of the loam had been filled. But aside from the usual seams, the casting came out perfect, the medallians being unusually clean cut, only a little working over with sandpaper being required to render them all that was required.

"The Whiting Foundry Equipment Co., of Chicago, Ill., report having made recent ship-

ments of the Whiting Cupola as follows:

One test cupola to University of Illinois, Champaign, Ill.; one 14-ton per hour cupola, Globe Iron Works, Cleveland, O.; 5-ton cupolas to Hazleton Iron Works, Hazleton, Pa., Cornish, Curtis & Greene, Ft. Atkinson, Wis., J. M. Saville & Sons, Canton, Ill.; one 12-ton per hour cupola, Ames Iron Works, Oswego, N. Y. They also report having recently shipped two 20-ton and two 15-ton ladles to plants connected with the American Steel Casting Co., of Alliance and Pittsburg. They are running to their full capacity.

The Western Foundrymen's Association.

THE regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, November 20, 1895, at the Great Northern Hotel, Chicago. The president, John M. Sweeney, occupied the chair.

Those present were the following: Thos. D. West, Thos. D. West Foundry Company, Sharpsville, Pa.; A. W. McArthur, Rockford Foundry Company, Rockford, Ill.: J. T. Rowlands, J. I. Case T. M. Company, Racine, Wis.; G. H. Carver, Plano Mnfg. Company, West Pullman, Ill.; E. H. Walker, Emerson Mfg. Company, Joliet, Ill.; John M. Sweeney, A. L. Bowen, Chicago Consolidated Iron & Steel Company, Harvey, Ill.; Wm. M. Wilson, Cleveland Facing Mills Company, Cleveland, Ohio; James Frake, W. F. Harroweer, James Frake; John Fraser, M. E.; A. J. Oehring, J. Barr, Western Electric Company; D. De La Fontaine, Crane Company; O. T. Stantial, H. E. Bullock, L. W. Lukens, Illinois Malleable Iron Company; H. L. Hotchkiss, Deering Harvester Company; M. C. Bullock, M. C. Bullock Mfg. Company; Prof. J. D. Young, Armour Institute; C. E. Lewis, Forster, Hawes & Co.; A. M. Thompson, Link-Belt Machinery Company; E. E. Hanna, Wm. Ferguson, Gates Iron Works; H. F. Frohman, Jas. E. Evans, S. Obermayer Company; W. D. Barton, Siemens & Halske Electric Company; A. Sorge, Jr., S. T. Johnston, Whiting Foundry Equipment Company; P. L. Sutter, L. Wolff Mfg. Company; James Brady, G. C. Batten, Kurtz & Buhrer Foundry Company; Ed. Welch, Wier & Craig Mfg. Company; Leo Salomon, Will Salomon, Chicago Architectural Iron Works; R. F. Palmer and B. M. Gardner, all of Chicago.

Mr. Sorge reported that the committee on headquarters for the association is in a position only to report progress and to ask for more time. Mr. Frake reported that the committee on by-laws had prepared a complete set of by-laws, but as there were several papers to be read he moved that the by-laws be printed and distributed to each member of the association and the consideration of them be postponed until the next meeting of the association. The motion being duly seconded was carried. The secretary read the following applications for membership and, on motion, the applicants were unanimously elected: G. H. Carver, superintendent Plano Mfg. Company, Chicago; Rogers, Brown & Co., Chicago; Bates Machine Company, Joliet, Ill.; Buffalo Forge Company, Buffalo N. Y.; Chicago Architectural Iron Works, Chicago, Ill.; Wililam Berquist, Ornamental Iron Company, Chicago, Ill.

Thomas D. West, of Sharpsville, Pa., read a paper on "Stretching Cast Iron and Elements Involved in its Contraction," which was written with a two-fold object, that of dealing with the contraction in cooling and that of attacking the latest experiments made by Keep and Henning, which were embodied in their paper on "Cooling Curves" beforee the Detroit meeting of the American Society of Mechanical Engineers. Mr. West urges that it is not safe to follow blindly the stereotyped rule of allowing 1-8 inch per foot for shrinkage, or contraction, as he seems to prefer calling it. Size of casting, rate of cooling, composition of metal, form of mold, etc., have their influence. Mr. West criticises Mr. Keep's work on the following grounds: The device as arranged by Mr. Keep puts a strain on the test bar when it commences to contract, and as the metal continues to draw together under the strain, it is stretched and occasionally recovers sufficient power to exert at intervals a pulling together or contracting effect. And thus, instead of recording an even, steady contraction or straight line, as exists where full freedom is given, the device records erratic or uneven curves, according as the influence of contraction in the test bar gains the greater power over the resistence of the levers used in Keep's device. The softer the iron the greater the effect in

this direction. This is shown to be the case with the lines recorded in Mr. Keep's experiment and confirms the belief in the impracticability of Mr. Keep's device for proving that there are three states of expansion in iron cooling after the molten metal has solidified.

Expansion in iron only takes place at the moment of solidification, and is a natural quality which will evince itself in the direction offering the least resistence. "Stretching is due to artificial influences exerted by conditions in casting, cooling and forms of patterns, to overcome or retard free contraction. It can make castings larger than the patterns from which they were made, and also makes it possible to obtain acceptable castings which could not be secured were it not for the ability of iron to be stretched.

Mr. West describes an apparatus which he has designed to prove that resistance, occasionally relieved, accounts for the Keep cooling curves.

Mr. Keep followed with a paper, read by the secretary, in which he referred to facts which were difficult to explain until the discovery of the cooling curves. Mr. Keep meets Mr. West's objection by stating that his machine is practically frictionless, all sliding parts moving on rollers. The short ends of the arms are attached to the two ends of the test bar by steel pins. The sand is not rammed hard and it does not touch the machine. The gate is at the center of the bar, so that nothing except soft sand touches the test bar, which is free to expand or to shrink. A fluid test bar or casting cannot exert any force in any direction except the pressure of a liquid. So long as the test bar remains liquid it might be quite full of solid grains and yet no expansion of individual grains could cause the whole bar to expand and grow larger. A casting or test bar must be a continuous solid before any expansion or shrinkage can change its length.

Referring to the fact that castings are often larger than the pattern, Mr. Keep quoted the following: The I. P. Morris Foundry of the Cramps Shipbuilding Company of Philadelphia were asked to measure the shrinkage of one of the cylinders of the steamship "St. Paul," which had just been lifted from the mold and which weighed 55,000 pounds. The answer of David Matlack, the foundry foreman, was: "It would be impossible to give the shrinkage on these cylinders now, for the reason that in large molds like these you never get the sizes exact to the drawings, for after they are built and dried there is a considerable difference from the original mold. When we want the shrinkage on such a mold, we have to measure it after it is dried and in the pit, and even then it is not sure, for if the mold should strain in pouring, say 1-2 inch, then the casting should shrink 1-2 inch, in measuring you would be surprised to find no shrinkage."

In the discussion Mr. West was the first to speak. We quote in part: "Mr. Keep says, 'knowing the silicon in any iron mixture and size of the casting the shrinkage can be computed by Keep's graphic shrinking chart.' I disagree with Mr. Keep and say that no chart can be devised to achieve such a result. Any practical founder can take almost any casting made under identical conditions, so far as that is practical in the molding and making of the casting, and yet have a great variation exist in the contraction of two castings, simply on account of the differences in the percentages of sulphur in the iron. One part of sulphur will neutralize from 10 to 16 parts of silicon, so effective is sulphur in affecting a change in the grade of an iron. It is wholly impracticable to substantiate Mr. Keep's claim that his chart truly defines the character of a casting when only the silicon contents and the size are known. I also know from experience that in remelting iron there is always considerable variation in the amount to which sulphur is increased in any two heats. In my practice I am as careful of the sulphur contents, if not more so, than of the silicon. I do not wish to be understood as affirming that a device cannot be arranged to determine the true contraction of an iron. To make such practical only requires us to ignore attempts at defining the percentage of the separate metalloids which may control contraction and simply refer to them as a whole, to be covered by the word 'grade.'

At the end of Mr. Keep's paper, after he has labored to prove the infallibility of set rules, charts, etc., to define the contraction of castings, he destroys his argument by publishing comments from David Matlack, which speak louder than anything I have said to prove the incorrectness of trying to tell the contraction

of a casting solely from a knowledge of its silicon contents. With regard to the assertion that Mr. Keep's machine is practically frictionless, this tells us nothing. It is impossible that these levers could be moved without some power and I am as interested as any one in knowing just what that power is; for the contraction can be affected by the smallest amount of restraint. If those erratic lines are recorded with the fullest freedom allowed to contraction, in Mr. Keep's device, then the impulsive, erratic movement of my restrained bar recorder is due to something other than contraction. My restrained bars show about the same kind of wild, erratic curves as those recorded by his device; the main difference being that most of the expansion and contraction takes place sooner by my method than by Mr. Keep's. I would attribute this to the conditions causing my bars to cool quicker by being cast in open sand, whereas Mr. Keep's were cast with a cope on them. In closing I have a question to ask. Why is it that both our devices clearly define that an expansion takes place at the moment of solidification, and if such takes place afterward why does not my free bar record it the same as it does when the iron is under strain?"

A. Sorge, Jr.: In discussing this paper I will first state a few premises before going into a detailed consideration, which is difficult on account of the absence of exact data. The mixture of iron used in a casting determines the shrinkage, all other things being equal. In other words, if there be known the characteristics of the casting to be produced and its principal dimensions, then we can decide on the mixture of iron to be employed, and this mixture will have a definite shrinkage for each thickness, if extraordinary conditions do not prevail. By extraordinary conditions I mean either very rapid or very slow cooling, great differences in thickness of various parts of the same casting, ill constructed molds or radical changes in manipulation or pouring. If the molds and cores are properly made and their construction has been taken into account by the pattern maker then the size of the finished casting can be predicted very closely by the foundryman who carefully studies the charisteristics of the mixtures of iron which he employs. Iron always shrinks when cooling from the liquid state down to ordinary atmospheric temperature. If a casting turns out larger than the pattern, or even of the same size, then there has been faulty work done in the foundry by the molder or coremaker, or in the pattern shop by the pattern maker. In all considerations of this kind it must be assumed that the different parts of the casting have been properly proportioned. If this is not the case (and unfortunately the proportions are frequently bad) then special provisions must be made to partially neutralize the effect of the bad proportions, or, better still, the design should be changed. Mr. West states that thin castings contract more than thick ones because of the formation of smaller molecules and grain in the former than in the latter. I presume he means by this that the smaller crystals in the thinner castings will arrange themselves more compactly than the larger ones in the heavier castings and thus take up less room, thereby making the castings smaller and the shrinkage greater.

Mr. West claims that the period of cooling has more to do with the shrinkage than the chemical composition. But he must admit that under equal conditions of cooling the varying composition of the iron will determine the shrinkage. In the ordinary foundry it is customary to so proportion the mold and to so time the period of shaking out and the amount of covering, that this time of cooling shall be fairly uniform for different pieces of similar size and it is only in exceptional cases that special pains are taken to either hasten or prolong the cooling period. Therefore, although all experienced foundrymen are well aware of the effects of varying cooling periods, this condition is usually assumed to be uniform in a given foundry, and we are led to look to the chemical composition of our iron as the controlling element in the shrinkage and not to the cooling period.

Mr. West makes the asertion that the test bars in the recording apparatus originated by Mr. Keep are strained and are not permitted to contract freely. I have myself seen the apparatus and have witnessed a record made by same, and can bear testimony to the fact that the bars are free to expand or contract except so far as the sand of the mold would offer resistance. The apparatus itself cannot put a strain of even as much as a few pounds on the bar; the only resistance is due to the

moving of the levers carrying the drum driven by clock work and the recording pencil. I have a letter from Mr. Keep which somewhat supplements his article and I will read an extract therefrom on this subject: "This is a sketch of my new machine which is of exactly the dimensions of the first one. The shaded arm and slide belongs to the pencil. The other belongs to the revolving drum. These move in opposite directions and as each arm multiplies ten times, the record multiplies twenty times. The front of flask is cut away to allow the frame of machine to be hung on. The test bar lies in an ordinary mold free to move in the sand in every direction (without any yokes). The machine is as near frictionless as it is possible to make it. The sand is scraped away at each end to expose the surface of the mold, which is covered with pieces of tin through which steel pins enter the mold. These sheets of tin move between the sand of the cop and nowel quite freely. The records would not be materially influenced if the ends of the bar were fastened to the ends of the flask, as the power exerted by the bar in shrinking is nearly 1-2 ton and it would pull out the ends of the flask. To illustrate, I used large pieces of tin four inches wide and clamped the edges between cop and nowel of a new flask as tight as I could. The test bar was 1 inch wide by 1-8 inch thick by 24 inches long. The tins were drawn through enough to strongly mark the surfaces.

"Under the gate the bar was drawn open while the metal was plastic, but as soon as set the whole shrank and pulled the tins through from between the wood surfaces. The test bar was not influenced in the least, and if it had been run with a gate as thin as 1-8 inch it would probably have remained intact. At one time with a 1-inch square bar I had fastened the outer ends of each arm and forgot to loosen them. When I returned the frame of the machine was badly strained, but on releasing I found that I had a perfect record. The friction of a sand mold on a straight casting would not influence the shrinkage. If any part pulled off it would have been fluid (plastic), while the rest had begun to shrink. A 1-inch square bar with 2 per cent silicon does not begin to shrink until it loses its bright red, and it would then require at least 700 or 800 pounds to influence its shrinkage."

Mr. West defines expansion in iron as being an action which only takes place at the moment of solidification. I beg to take direct issue with him on this point. Expansion may and does occur in a number of instances that have no relation to the change of molecular condition which occurs at the moment of solidification. Expansion increases the volume of a body, and this increase may be due to various causes, but is generally caused by the absorption of moisture, in other bodies by the formation of gases, etc. Again, he states that "stretching is due to artificial influences exerted by conditions in casting, cooling and forms of patterns, to overcome or retard free contraction. It can make castings larger than the patterns from which they were made, and also makes it possible to obtain acceptable castings which could not be secured were it not for the ability of iron to be stretched." The fact is that stretching is the elongation of any body due to tensile strains, whether these strains are due to a resistance to free contraction while the casting is being made or are intentionally applied by external means at any time.

It has been well known for a long time that all bodies can be stretched or elongated by putting strains on them, and the amount of this elongation due to a given strain depends upon the condition of the body. It will naturally be greater in a plastic body like iron directly after solidification than in a cold body.

The apparatus constructed by Mr. West to show the effect of tensile strains on bars of iron does not appear to me to be sufficiently accurate to give results that can be relied upon. We have no means of showing the effect of the hot test bars in close proximity to the iron frame of the same, and the expansion of this iron frame due to conduction of heat did unquestionably affect the records. Furthermore, the shrinkage of the iron contained within the clamps themselves would certainly influence the movements of the pointer by leaving the chilled iron in the clamps loose, and would be more pronounced when the bar is under strain than when free. It appears to me, therefore, that the results, although interesting, cannot be used as a basis for accurate conclusions. The construction of the apparatus makes the observation unreliable. The statement by Mr. West that the movement of the pointer to the right of zero indi-

cates expansion at the moment of solidification seems to be unwarranted. If the metal is still fluid its expansion cannot be correctly shown by this device, as the expansion would take place in the direction of least resistance, and we have no means of determining that the resistance is smallest in the direction of the length of the bar. Furthermore, the gates will act as feeders if there happened to be any contraction while in the fluid state. All extra supply of metal must be cut off from a test bar if it is desired to determine the expansion or contraction of same before it becomes solid. I neither assert nor deny that there is an expansion of the iron at the moment of solidification, but this apparatus will not show it conclusively, and I know of no accurate experiments to determine this question.

G. H. Carver: I would like to ask Mr. West if he really meant what he said when he made the remark that he paid more attention to the amount of sulphur than the amount of silicon in the mixture?

John Pettigrew: I have had some experience in the shrinkage of cylinders. Our practice used to be to make them to the shrinkage rule exactly, and invariably the cylinder has been just a little too big. The cause is ascertained by measuring the core of the cylinder after it comes out of the oven. It is then found that the expansion of the sand is the cause. The expansion of the material of which the mold is made is an important factor.

Mr. West: Mr. Sorge tells us that there is practically no power required to move Mr. Keep's levers. He says that the arms may weigh three pounds apiece. There is one experiment that I should like to see tried. That is simply to take hold of the short arms of the lever with a pair of steelyards. By that means it will be possible to tell just what power it takes to move the levers. I asked the question at the close of my remarks on Mr. Keep's paper, why we should find the expansion recorded precisely the same in two devices. We see by my free bar that it will expand. Mr. Keep's shows that also. Now if there is an expansion in the iron after it has solidified, what is there to prevent the free bars from showing it? I think that when you take up that question and try to answer it you will be led to see there must be something in Mr. Keep's device that requires power.

One gentleman asks if I really do take into consideration sulphur more than silicon. In our practice at our foundry we are melting at the present time 50 to 70 tons of iron every heat and day. We make molds that are used for Bessemer work and we are limited to keep within Bessemer limits. We have silicon, sulphur and magnese in the iron. When iron is low in silicon we take every precaution to know where the sulphur is. If the sulphur is up to 0.04 it would be very risky to attempt to use it in the iron that would be 1.50 in silicon. We use a limestone for the flux and it assists in reducing the sulphur if we run a hot slag, but if we do not have a hot slag we must look out for trouble.

James Chalmers.

The History of a Tramp Molder.

W. EDWARD.

CHAPTER XXIII.

IN THE few weeks that I remained in Cleveland I became thoroughly disgusted with the place, and never felt happier than when when I at last shook its dust —I should say its snow—from my feet. All the time I was there the thermometer hung around the zero mark, and for several days it was 10 below. I tell you its no picnic to crawl out of a warm bed on such a morning and have to break the ice in the pitcher in order to get water to wash, then to eat a hurried breakfast, with the chills chasing each other down your spine, and walk half a mile to the shop with the wind blowing a gale off the lake, and the frozen spray cutting your flesh. In the mornings especially I used to imagine what it would be like down in Texas about that time, with the flowers bursting into bloom, the birds singing, and all nature exhaling the odorous breath of spring, and then contrasting it with the bleak and cheerless north, where the whole earth, and even the people, seemed wrapped in a mantle of snow and ice. Had the conditions in the shop been pleasant I might have stuck to it until spring, but the men in the shop disgusted me equally as much as the weather and made me doubly anxious to get away. The secretary of the union worked on the

next floor to me, but he was afraid to ask for my card, and when he did find out that I had one he invited me to go up to the meeting and deposit it. I wouldn't do this and told him that I didn't believe in paying money in to help a lot of men who were afraid to call their souls their own.

Cleveland used to be a mighty poor place for a molder, but I hear that it is much better now since the brotherhood organized there, as this seemed to inject a little stamina into the other fellows, and the rivalry between the two organizations, if it did nothing else, bettered the condition of the molders.

When I quit Bowler's, I didn't look for a job far south of the Ohio river as I could and get there as quickly as possible. I knew there would be little show for work anywhere in in any of the other shops, as I was too anxious to get to a country where I could get the icicles thawed out of my system, and where the men had a little more independence in their make-up. I made up my mind to get as the south at that season of the year, but I concluded that life on the road under a genial sky was preferable to hard work, low wages and the inhospitable climate of Cleveland.

I had no money to pay railroad fare, because I didn't know how far or how long I might have to go before I struck another job, and what little money I had I wanted to save so that there would be no danger of my not being able to "chew" regular. The most direct route to the south was over the "three C.'s and I," to Cincinnati, and then either the Southern or the L. & N., whichever I could work the easiest; so the next evening, after quitting Bowler's I boarded a through train for Cincinnati. My intention was to dodge the conductor as long as I could and trust to luck; if I was caught and put off I would take the next train and try the same game over again. It was about 4 o'clock when the train started and, as it was a long one, it was quite dark and the train was well out of the city before the conductor came through the car where I sat to collect tickets. As soon as he entered the car at the front end I got up and walked back into the sleeper. The porter stopped me and asked if I had a ticket, but I told him I was looking for a friend on the train and he allowed me to pass. I went on through the car, opened the door of the smoking compartment, in which there were four or five men, and looking out to see that I was not observed by the conductor or the porter I stepped out into the vestibule and then out on to the back platform, where I got down on the lowest step and sat as close to the car as I could get.

In about fifteen or twenty minutes I saw the gleam of a lantern at the door, but as it was a bitter cold night I thought the conductor would not care to venture out on the platform to make a closer inspection. In a minute the light disappeared and I breathed a sigh of relief, as I knew I would not be disturbed for thirty or forty miles, and might make it into where I knew I would have a better show of getting out than I had in Cleveland.

It was bitter cold on the platform with the train running thirty-five or forty miles an hour, but I was well fortified to stand a siege of cold, having on an extra suit of underwear and a heavy overcoat, besides a bottle of Gibson in my inside pocket, out of which I took an accasional "snifter." I kept a bright lookout for stations when the engine whistled, and took care to be on the opposite side from the station when we stopped, where I could crouch down on the steps and be out of sight of any one on the platform. Just as we pulled into Galion Junction I came near being caught. The train slowed up a couple of hundred yards from the junction, then pulled on again. Just then the sleeping car conductor came out on the back platform, but I saw him coming and got down on the lowest step and swung out as if I was about to jump off. He saw me and asked where I was going. I said I was riding up to the junction and he said nothing more, only he watched to see me jump off at the junction, and then he went in and closed the door.

Of course I got on again as soon as the train started, but I expected every minute that he would come out to see if I was still there. However, he seemed entirely unsuspicious of me and I was not bothered again until the train pulled into Delaware. Here engines and crews were changed and as I did not want to be seen hanging round the train, I went into the lunch room and had a cup of coffee and a sandwich, then I went into the smoker, lit a cigar and sat up close to the stove warming myself, until I heard the conductor sing out, "all aboard."

As soon as the train began to move I got out and waiting until the sleeper came along I swung on to my old perch again, but here I was treated to a surprise, for just as I clambered up on the steps the door opened and the porter came out on the platform. Without waiting for him to ask any questions I panted out, "that was a mighty close call, another second and I would have missed the train." The porter grinned and said, "sleeper sa'h." "No," said I, "day coach," and I opened the door and walked on through the sleeping car as if I was going to the forward end of the train. I was now, as it were, between the "devil and the deep sea." I couldn't get back to the rear platform while the train was in motion, and if I went forward the conductor would "brace" me for my ticket, and probably put me off at the next stop. I was not going to give up without a struggle, however, after having been so successful on the first division, so I concluded to stay on the platform and when the conductor passed from one car to the other I would swing out from the lower step against the side of the car and trust to luck and his anxiety to get in out of the cold not to discover me. It was a rather ticklish thing to do, as I run chances of being knocked off the train and having my brains dashed out by a close bridge, or one of these arrangements for catching the mail. It would only be for a minute though; he would either discover me and pull me in or he would fail to see me and pass on into the sleeper. I stood at the door and watched him come through the car and just as the light of his lantern gleamed on the end of the sleeper, and I knew he was opening the door, I swung myself around the corner of the car and clung against the side, with my left foot on the lowest step and my left hand clutching the guard rail like a vice. Nothing was visible of me from the platform except my hand and forearm, and coming out of a brightly lighted car into the darkness this would not be readily noticed. I clung to the side of the car for a few seconds, but the speed of the train was so great that I was compelled to swing back on to the step again, or I would have loosened my hold and been dashed to pieces. It was long enough, however, for the conductor to pass into the other car, and for the time being I was safe from discovery.

I sat down on the steps for a minute to recover my nerve, as I was all in a tremble from the strain, and I took a big "swig" out of my bottle, which braced me up wonderfully. I was afraid the conductor would not remain very long in the sleeper and I had no idea of risking my life a second time, so I got up and looked into the forward car to see if any of the "brakies" were there, and seeing none I walked in. All of the passengers were either asleep or comfortably fixed for the night, and in walking down the isle I brushed against a hat which hung over the corner of the seat and it fell to the floor. In picking it up I very carefully abstracted the conductor's punch slip before handing the hat back to the passenger, who was more than half asleep, and to whom I muttered an apology for my awkwardness, then I walked on into the next car, and having hung my hat on the rack with the red slip of pasteboard showing conspicuously, I settled myself very comfortably in my seat to await results. The heat of the car made me drowsy after my long ride in the cold and in a few minutes I was sound asleep.

I was dimly conscious of the train stopping at Springfield, where we again changed conductors, but I was soon in a sound sleep and lay there until the conductor came to collect the tickets. He shook me roughly and asked for my ticket, and after yawning and rubbing my eyes I sat up and began to search in my pockets, then as if suddenly remembering I said, "I gave you my ticket a couple of hours ago." "Where to?" he asked. "To Springfield," said I. The conductor grinned and said: "Why, we're ten miles from Springfield, the best thing you can do is to get off at the next station and go back on the first train." I grumbled about not being wakened at Springfield, and the conductor passed on, then I settled myself in my seat again and was soon sound asleep. The next thing I knew the train was pulling into Cummingsville, and the "brakie" was wakening the passengers, getting them ready to get out when the train reached the depot in Cincinnati. When the conductor came through I braced him for a ticket back to Springfield and made a terrible "howl" about him letting me sleep all the way into Cincinnati. He guyed me about being such a sleepy head, and, evidently believing me, he said he would fix me for a ride back to Springfield with the conductor on the first train.

I wasn't looking for a job in Cincinnati, and while there was a wonderful difference between the weather there and in Cleveland it was not warm enough to suit me. What I wanted though was a good sleep and I took a car over to Newport, where I put up at an hotel and went to bed, leaving word to call me for supper. That night I struck a through freight on the L. & N., and by luck I found a refrigerator car and crawled into the compartment where they carry the ice, but there had been no ice in it for months, and in the close box I was soon warm and comfortable. It was daylight when we reached Louisville, and the car I was in was switched on to a side track, but I had noticed that it was billed through to Chattanooga and I was not going to abandon my warm retreat unless the car was held over more than one day. I had a good lunch with me, which I had had put up at the hotel where I stopped in Newport, so I eat what I wanted and curled myself up for a sleep.

Chicago and Vicinity.

With few exceptions the foundries have slacked off considerable during the past month. With the dawning of the New Year it is to be hoped will come a revival and the foundries will have the busiest year they have had since the panic. If business increases proportionately during the year of '96 as it did in '95 the foundries can have no cause to complain, and if they allow things to take their natural course and not borrow trouble, there is no reason why the year should not be a prosperous one. But it is human nature to worry and if there is nothing to worry about we hunt around until we find something. Already people have started to worry about next year and say that it is presidential year and they never knew a presidential year to be any good. This is all rot. There is no reason (if the people will only think so) why the presidential year should be any different from any other year, so far as business is concerned. If the people arise and with one acclaim, say that next year will be a poor one, it is bound to be dead. They say you can make a man think he is sick by telling him so; you can kill the year's business by telling the people before hand that business is to be poor. If the people want next year to be a poor one they are certainly taking the right steps. On the other hand, if they wish it to be a prosperous one, they must stop all this talk about a presidential year always being a poor one. Whatever party may be elected it will not dare to advocate a policy that would materially injure the manufacturing interests of the country. Let us cast aside this fallacy by thinking that the man the people elect president will be an American and that his interests and those of the people he represents are as dear to them as our individual interests are to us, and that he cannot do anything to injure the manufacturers without jeopardizing those of his own; but if the people must have trouble, wait until it is here. Let us cross the bridge when we come to it.

The Porter Co. will move to Ottawa, Ill.

Fraser & Chalmer are busy.

A. Bolter & Son continue to have a good business.

J. H. Bass has the contract for making all the cast iron work for the I. C. Railway and is quite busy.

The Globe Wind Mill & Pump Co. have purchased the foundry plant of the Porter Co. at Turner Junction and will move their business to that place, where they expect to be established and in running order by January 1st.

Stockham Manufacturing Co. purchased from Bennet & Johnson, brass founders, their business, good will and accounts. They have completed negotiations for the Gray Iron Foundry at West Forty-sixth street and Grand avenue, formerly owned by Russell Bros. & Young. These two plants will be consolidated. They will make a specialty of light gray iron and brass castings.

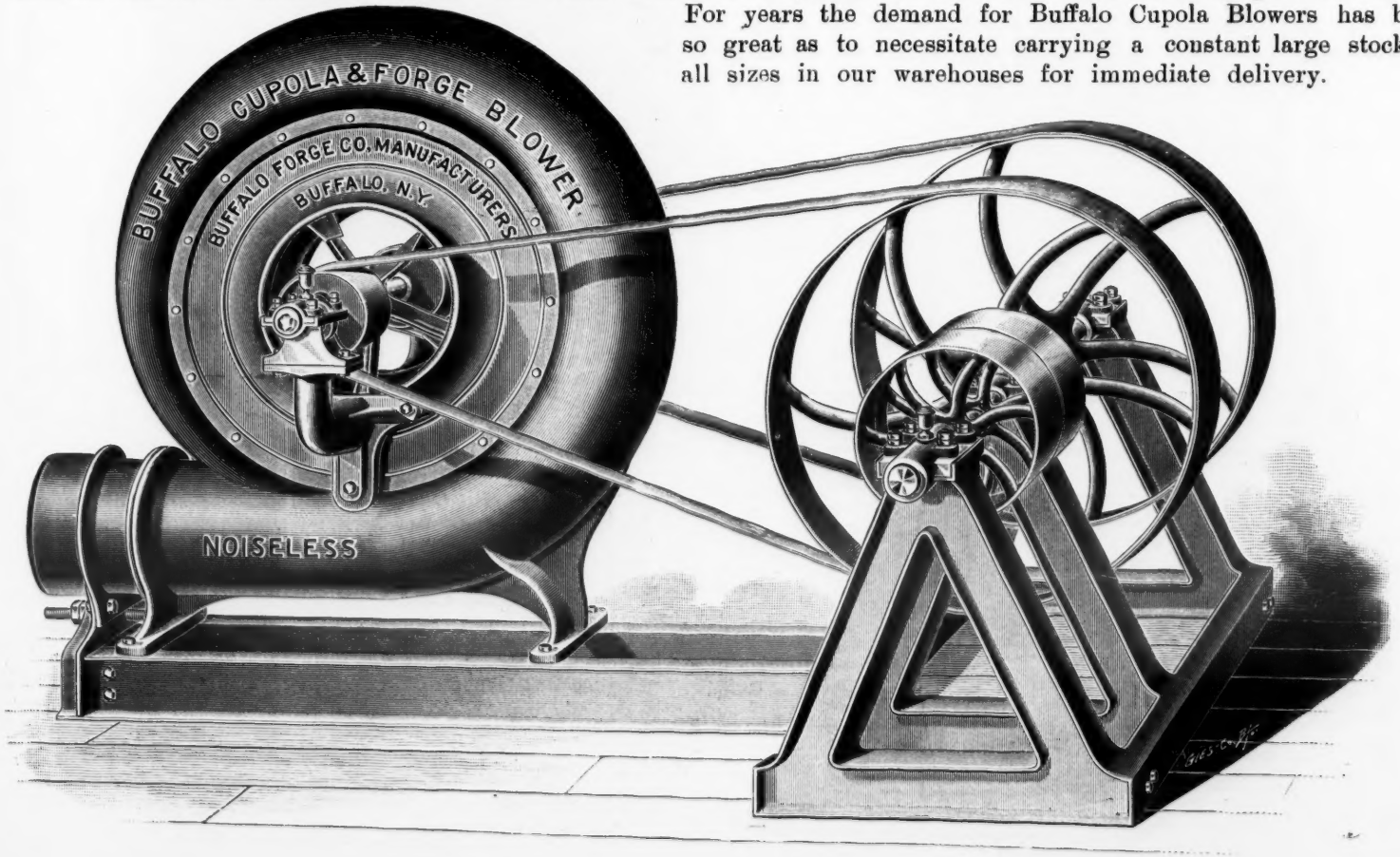
H. S. V.

The Millett Core Oven Co., Brightwood, Mass., report having had a good season with their ovens, and state that those having them in use seem to be as much delighted with them as ever. They express in their advertisement elsewhere a willingness to ship them on 30 days' trial. Evidently they must feel considerable confidence in them.

Rogers, Brown & Co. have been sending their friends recently a neat booklet containing a brief table compiled from official reports by Mr. Geo. H. Hull, president American Pig Iron Storage Warrant Co., and it shows much information of value to the pig iron user, and we therefore reproduce it below:

The Latest Developments in Foundry Blower Construction is fully detailed in the 1896 catalogue of the Buffalo Forge Company, Buffalo, N. Y., U. S. A. You are, perhaps, remodeling or building a new plant. Much data of unusual interest is contained therein. Its value needs no emphasis to those who have reviewed previous issues.

For years the demand for Buffalo Cupola Blowers has been so great as to necessitate carrying a constant large stock of all sizes in our warehouses for immediate delivery.



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Especially well adapted for Foundry use or wherever careful handling of loads is required. Thus copes and moulds can be lifted and transported with absolute safety. There is no jumping of chains; no jarring of load; no loss of sand; no breaking down of mould.

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The chains wind on a drum, having right and left spiral threads. The hand chain wheel is removed from the line of the load by means of extended shaft a fact which is of great advantage to the operator. The crane is supplied with roller bearings and travels with an easy steady movement. It is equally well adapted for heavy or light loads.

Let us give you an estimate. State required span and capacity.

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DOUBLE CHAIN SCREW HOISTS.

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Connersville Blower Co., Connersville, Ind.
Garden City Fan Co. Chicago, Ills.
Root, P. H. & F. M. Company, Connersville, Ind.
Sturtevant Company, The B. F., Boston, Mass
Wilbraham Baker Blower Co., Philadelphia, Pa.

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Washington Coal and Coke Co., 7 Wood St., Pittsburg, Pa.

CORE COMPOUNDS.
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Foundry Outfitting Co., Detroit Mich.
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Harrington, E., Sons & Co., Philadelphia, Pa.
Phœnix Iron Works Co., Cleveland, Ohio.
Shaw Electric Crane Co.
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CRUCIBLES.
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McCullough-Dalzell Co, Pittsburg, Pa.
Taylor Crucible Co., Robt. J., Philadelphia, Pa.

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Springfield Cupola Co., Springfield, O.
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Obermayer Company, The S., Cincinnati, Ohio
Ohio Sand and Clay Company, Columbus, Ohio
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The Gobeille Pattern Co., Cleveland, Ohio.

PATTERN MAKERS SUPPLIES.
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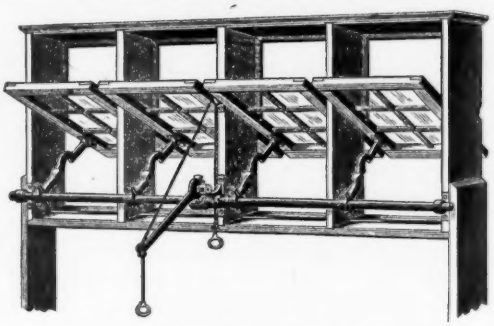

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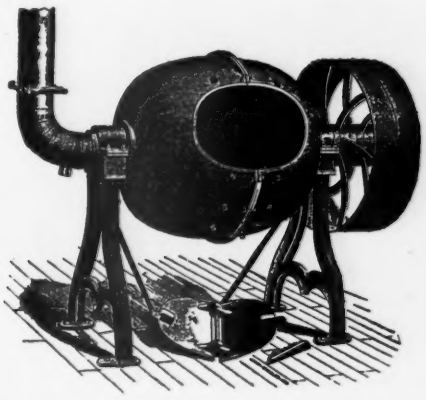

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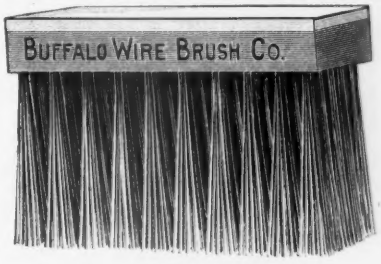

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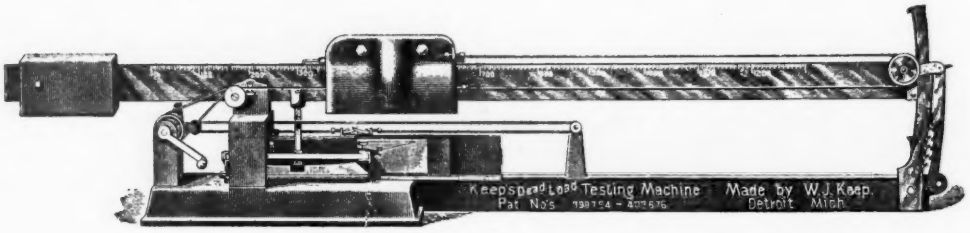

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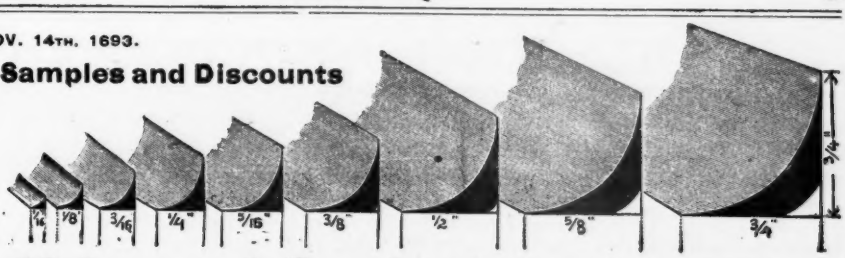

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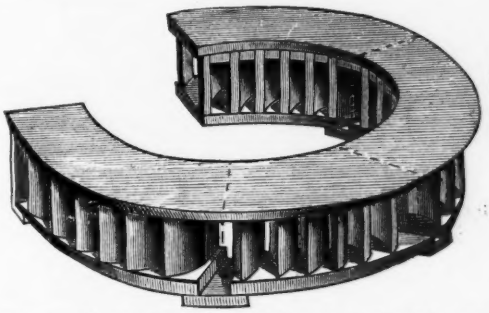

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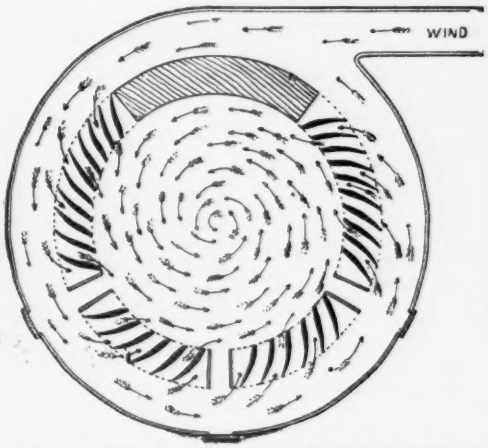

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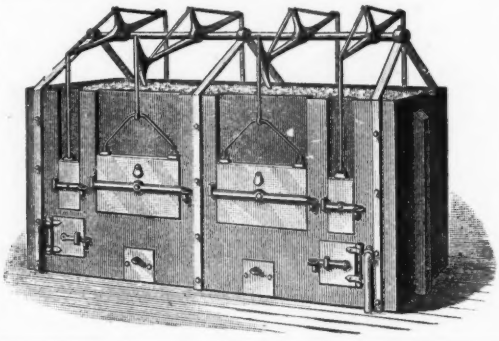

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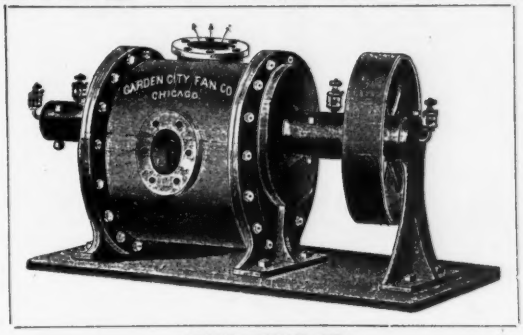

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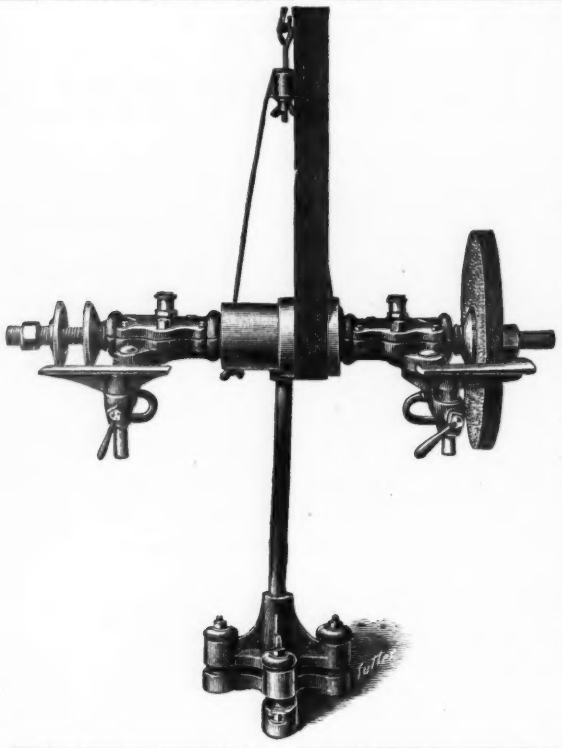

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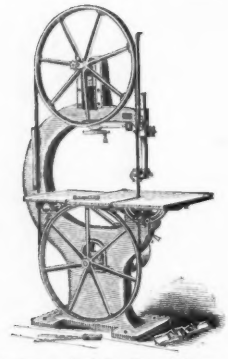

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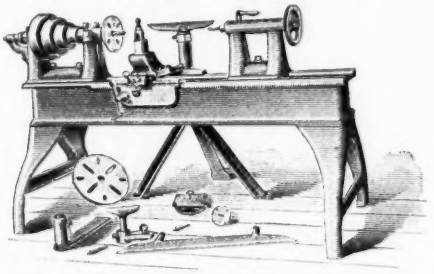

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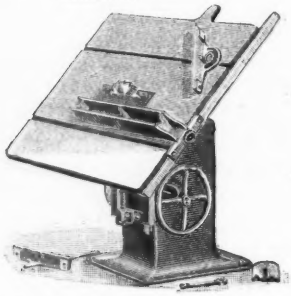

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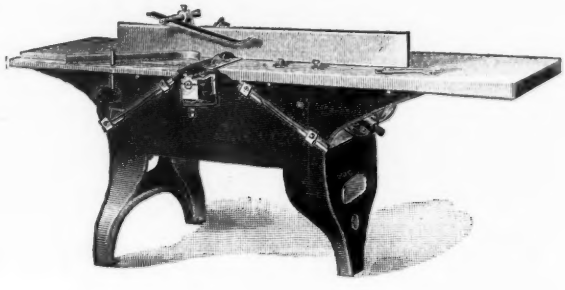

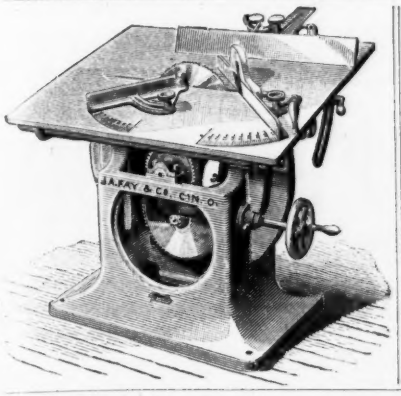

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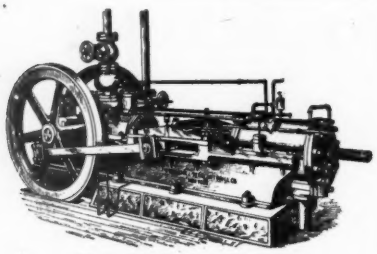

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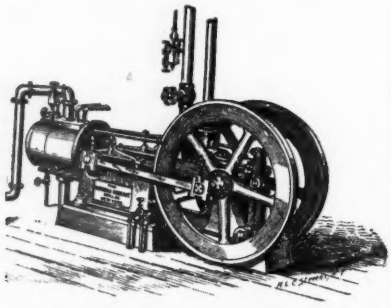

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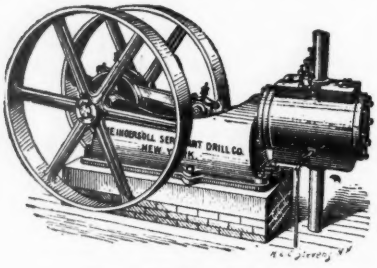

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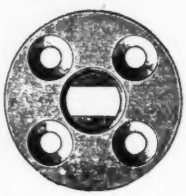

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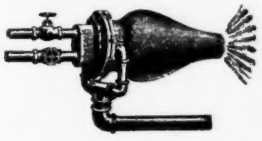

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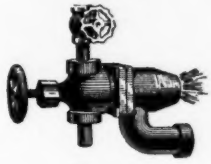

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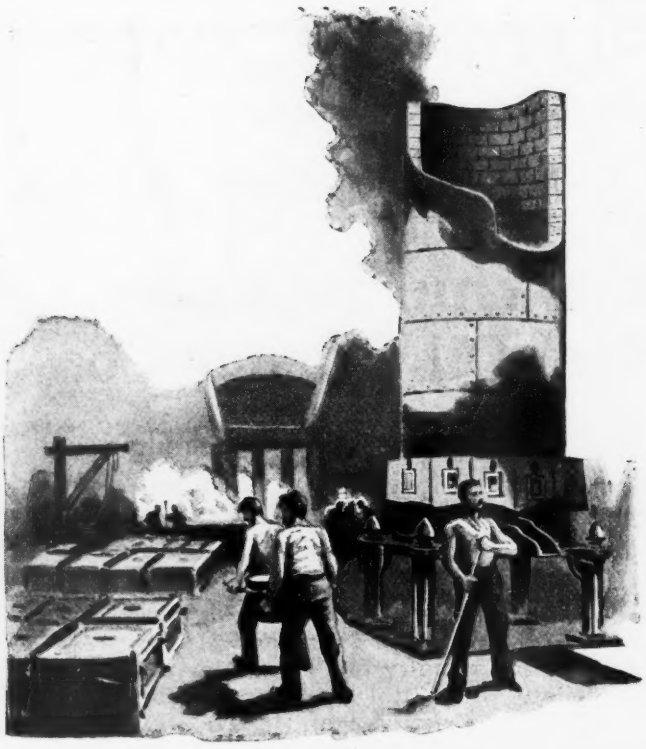

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